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A GUIDE TO PHOTOGRAPHIC CONTROL

BY TOWNSEND GODSEY

FREE LANCE PHOTOGRAPHY
A GUIDE TO PHOTOGRAPHIC CONTROL

A Guide to

PHOTOGRAPHIC CONTROL

Townsend Godsey

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*This book is dedicated to Bil and Pidge and Kátýe
and their friends, in the hope that the information
contained herein will enable them better to partici-
pate in life through photography.*

A C K N O W L E D G M E N T S

Due credit in the making of this book should go to my colleague Phil Hug, of the Photography Department of Stephens College, and to Professor Clifford C. Edom, of the School of Journalism at the University of Missouri, for helpful suggestions and criticism; to Robert Swan, of the Stephens College Art Department, for drawings; to the members of my Free Lance Photography class who served as "photographic guinea pigs"; and to my wife, Helen, without whose editorial help the manuscript would never have been readable.

—T. G.

CONTENTS

PREFACE: <i>LIGHT IN THE DARKROOM</i>	xi
INTRODUCTION	xix
PART ONE: <i>CONTROL THROUGH IDEA</i>	3
The Photographic Concept—Approach—Subject Choice—Development of Idea—Idea Into Layout —The Unity of Variety—Visual Symbols—Sym- bolic Color—The Final Choice.	
PART TWO: <i>CONTROL WHEN TAKING THE PICTURE</i>	48
Some Properties of Light—Refraction—Light Around the World—Choice of Film—Camera Position as a Control—Choice of Lens—Choice of Lighting—Key Lighting—The Shape of Faces to Come—Camera Presence—Control Through Makeup—About Exposure—Filters—The Expo- sure Meter—Hypersensitizers.	
PART THREE: <i>CONTROL WHEN PROCESSING THE NEGATIVE</i>	106
Control To Achieve Quality—Desensitizers—Film Development—Film Developers—Temperature— Agitation — Neutralizing — Fixing — Washing— Drying—Intensification and Reduction—Dyeing —Retouching.	
PART FOUR: <i>CONTROL WHEN MAKING THE PRINT</i>	134
About Enlargers—Types of Enlargers—Masking —Diffusion Devices—Texture Screens—Exposure Control—Focusing—Distortion Control—Choice of Paper—Timing—Darkroom Eyes—Control of Development—Developing—Judging Print Qual- ity—Stop Baths for the Print—Fixing—Washing —Drying—Dressing Up the Print—Tricks of the Trade—Solarization.	
CONCLUSION	191
BIBLIOGRAPHY	192
INDEX	193

PREFACE

LIGHT IN THE DARKROOM

PHOTOGRAPHY is one of modern man's most vital forces of communication. It has taken three wars, an economic depression, and a struggle for the conservation of our soil to awaken Americans to the idea that photography as a form of communication demands intelligent consideration. And the ability to make a good photograph may some day be a component of literacy tests.

Photography is fundamentally a process of skill and discrimination. As such, all of the tools used to produce a good photograph are under the continual control of the photographer. Moreover, consistently good photographic results are the product of consistent control. "No photograph is good or bad except a photographer makes it so." The camera is merely a tool by means of which a photograph can be made. In contrast to a machine, which is automatic in action, a camera is dependent upon the skill of the operator. The basic function of a machine is without variety, while a tool can be manipulated to produce in proportion to the degree of skill of the operator. Therefore the camera is a tool, used to take a photograph, and most of the subsequent photographic processes are under the constant control of the photographer. Techniques are not the end but are important means, since good and satisfactory photography is purely accidental without them.

Mechanics of photography may be taught as an art or science subject, but photography requires a broader application than most artists or art and science teachers are willing to give it. Photography

A GUIDE TO PHOTOGRAPHIC CONTROL

will not forever remain an undernourished stepchild. Give her time and opportunity to mature, help her to outgrow this adolescent puppy-love of the longhair, mate her with a virile realism, and she will beget a new breed of graphic art. And she will now best thrive in America because Americans love realism. They are like Mark Twain's Adam, who calls a giraffe a giraffe because it looks like a giraffe.

In his monograph, *Form and Space*, Wolfgang Paaden, a contemporary artist, admits that photography alone can represent reality. And he poses an interesting challenge to the photographer when he says that photography has become the ideal standard of realism in art. The public has come to accept photographs as images in which everyone best recognizes his own world. This is good and bad. Good because photography is admittedly a form of realism accepted by the public; bad because too many photographers may use public acceptance as a measure of success. And this is not a true measure by any stretch of the imagination. A viewer's ability merely to identify a symbolic image with an existing form does not establish a photographic standard of excellence.

A college art teacher whom I know claims that no picture is good if it is either sentimental or illustrative. Measured by his yardstick, any picture that inspires an emotional response other than a purely spiritual one is of no value because it appeals to the physical senses. Thus, should he be infected with the virus that compels men to make photographs, he would be most miserable, for he would be unable to drink of the wellspring that quenches a photographer's thirst—the depicting of life. Were he to desire to make a great photograph and consciously set out to achieve such a rare masterpiece by erasing from his list those subjects he considers carnal, he would soon have nothing but a blank page. Momentarily he would be stymied by such a situation. But once he began contemplating the reflected light from

PREFACE

that blank page he might consider its brilliance a purely spiritual subject. Then, if he were to interpret that light in terms of its brightness and the subsequent shadows its absence would create on life about him, he must utilize the basic principle of photography. By using a camera as an instrument to record this interpretation he then would suddenly become another photographer!

Crass commercialization and easy formulæ for gratifying the camera fan may have retarded photography in her coming of age. Photography's weaknesses of the past are symptoms of a deeper ailment, and an acknowledgment of these weaknesses may help to emphasize and strengthen her good qualities.

It is my opinion that photography in the past has been so dependent upon many outside forces, that until the last decade she has had small opportunity to develop much character of her own. She has been a victim of the jealousies of her unnatural parents, the painters, and the smother love of her foster parents, modern amateurs. When on occasion an enlightened worker, the advertising-art photographer or photo-journalist, for example, appears in company with photography we see her latent possibilities. For all her adolescence she is a creature with a desirable body and all the potentialities of fertile womanhood. The instability of her immaturity is only transitory.

Photography was not the product of photographers, but was developed from the desire of artists and silhouette-makers to turn out pictures faster than they were able to with paint, brush, and paper and scissors. It began as a science experiment, was taken up as an art medium, and too long was tied to the smock-strings of the artist who forsook his slower craft for this speedier one. It is significant that nearly all of the better-known early photographers were painters—Cameron, Hill, Rejlander, Robinson—and that in nearly every instance they used the camera to imitate painting.

A GUIDE TO PHOTOGRAPHIC CONTROL

So, early photographs (and even some as late as 1948) followed patterns cut by painters. Even the choice of subject matter was largely dominated by what the artist thought his contemporaries would consider apropos, a choice of what imitations to imitate. Long exposures necessary in early photography restricted the operator to formalized posed portraits. The nineteenth-century use of soft focus (like yours and mine) was an apology for:

1. Error of nature's treatment of the subject;
2. Error in the photographer's technique;
3. Failure of the picture to look like a painting.

The first firm step which photography took away from the painters, and from a portrait concept and use, was in the early attempts to make pictures to illustrate stories or poems.

There were exceptions, of course, in the work of photographers like William Henry Jackson, Peter Britt, and other pioneers who lugged their heavy equipment into the West to document the natural wonders of the region; or like Brady and his Civil War workers. Yet these men were working too far ahead of the dominating forces to change the course of popular photography. They were too busy taking photographs to be concerned with the academicians. The general concept of photography in 1875 was largely one of imitating blase Bohemian life by photographing imitations of "foreign characters"—maidens with dropped shoulder blouses and Grecian urns, sunburned men with Turkish-towel turbans. Such a concept is still in evidence in many of today's salons.

Had these artists who took up the craft been content to integrate their knowledge of form and organization into photography and allow photography to develop its own personality, all might have been well. But they were neither magnanimous nor secure enough in this new field to make a clean break. Instead of applying an art knowledge to photography, they usurped photography for art's sake. They

PREFACE

set up standards and methods on all sorts of hocus-focus bases, apparently to justify photography in art circles.

When photography appeared and fell in with the arts, it was a novelty. Any photograph was acceptable merely because it was an oddity. To make matters worse, photography had her beginnings in the unfortunate and unlovely age of the 1800's.

There was so little loveliness among the cast-iron bric-a-brac of the middle nineteenth century that an art-starved public became disgusted and turned to antiquities for patterns. Photography felt the trend. Simple portraits could not be made without benefit of such classic props as funeral urns, Grecian busts, or painted backgrounds of obvious Old World origin. This influence on studio workers led them around to making pictures with what they erroneously termed "Rembrandt lighting," another imitative gesture.

Photographers today recognize this style by the placement of a dominant single source of light at about a 45°-angle to the subject, slightly higher than the eye so that there will be a strong shadow area on the side of the face opposite the light source. For more than fifty years this setup has continued to be referred to as Rembrandt lighting, but it is as far from Rembrandt as night is from day. Rembrandt light was good for the great Rembrandt and all the little Rembrandts who followed, but this does not make it good photographic lighting, especially in a modern day of incandescent light, photoflash, and electronic-flash. The influence of antiquarian art in photography is demonstrated by this one of many similar art-conceived notions; for other examples of how nineteenth-century art still dominates some photographic circles, visit almost any of the twentieth-century photography salons.

Although photography is a modern medium well suited to moderns, it had to wait until the right time for its birthing. Principles of the *camera obscura* were known as early as 350 B.C., and Leonardo

A GUIDE TO PHOTOGRAPHIC CONTROL

da Vinci described a camera in the fifteenth century; but until people began thinking in terms of realistic living, photography could not be fully conceived. It could not have developed in the medieval days when living was keyed to ethereal and remote religious thinking. Man could hardly successfully photograph angels, cherubim, seraphim, and such images dear to the people of that age. It was generations later that he finally discovered a world of reality—that he began to take interest in the world about him.

Philosophically speaking, we might say that for countless centuries man contemplated the navels of deities—then discovered nature's—followed this by contemplating his own—and now is beginning to contemplate his neighbor's. It was in the third period of man's contemplation, after decades of thinking about a world of reality—of nature—that the natal day of photography approached. Medieval symbolism waned and man became more interested in what he actually saw. Telescopes and spectacles were developed, then the microscope and the camera. They all helped to broaden man's space perception. Seeing was believing. Moreover, the lens did things to a man's ego; it still does.

Early photographers developed pet techniques which they snobbishly passed on only to members of their families or to apprentices. Like many oldtime newspapermen, these photographers scorned exact training. Each had his own trade secrets which he shared with no one outside a chosen few. He exercised a kind of childish empiricism that precluded the extension of information beyond his own darkroom door. Thus the dissemination of information that Lewis Mumford says has been the basis of all our major technical advances was (and still is) checked by this personal system of know-how monopoly. Even today there are formulæ for the extravagant amateur, and different (and more economical) ones for the penny-saving commercial workers. Likewise, patent monopolies and protective tariffs

PREFACE

still keep practical and satisfactory color print-making and other processes and equipment from the markets.

Today, photography is confronted with a new challenge—that of being equal to twentieth-century concepts—if its techniques are to keep pace with the times. Practitioners must shake off the shackles that tie them to nineteenth-century thinking. As man develops an awareness of his fellow man, he also becomes more conscious of his own mortal being. He gains a larger perception of time and space. He wants to know what makes himself tick. He will no longer be satisfied with precious little pictures that stir no souls. He will not be satisfied with photographs that are devoid of emotional appeal.

American photography today stands approximately where American literature stood when Theodore Dreiser, Sherwood Anderson, and Sinclair Lewis startled critics with their realistic writing. These men pioneered in writing as they felt and saw. Some photographers are beginning to photograph as they feel and see. The way in modern photography has been pioneered by such men and women as the photographic prophet Stieglitz; experimenters Man Ray, Lux Feininger, realist Edward Weston; naturalist Ansel Adams; director Alfred Eisenstadt; social reporter Margaret Bourke-White; philosopher Steichen; illustrators Bruehl, Dahl-Wolf, Toni Frissell; and scores of others. They all undoubtedly felt the influence of the best in what the past had to offer, but they were not content to believe the mythology that because a thing is either antique or ultramodern it is good. They are all first-rate mechanics and accept photography for what it is—a process in which the workman acknowledges that his handling of his instruments will determine the results. Their work is further proof that it is the photographer's oneness with his technique that determines the final significance of his photographs.

When photographers as a group realize this necessity of a oneness with good techniques and accept photography for photography's

A GUIDE TO PHOTOGRAPHIC CONTROL

sake, the critics will cease to say, "There is nothing wrong with photography but the pictures!"

Let the light of understanding into the darkroom!

Townsend Godsey

INTRODUCTION

THERE are two types of people who seek how-to-do information from books on photography: those who want the author to do all for them, and those who desire to learn the possibilities in order to make their own selections and adaptations. This book is intended for the latter group. Its purpose is not to show how the-author-has-done-it, but to explain how you-can-do-it in such a manner that the finished photograph will be peculiarly your own. This purpose can be achieved as the knowledge of photographic control broadens.

The ordinary garden variety of photography includes almost no concern for photographic concept or development of idea and layout. Believing that good photographic approach is of tremendous importance to the development of photography, and that cameras, films, and developers are all much farther advanced than the public concept of photography, the entire first part of this book is devoted to beginnings in thinking photographically: "Control Through Idea."

Only after the photographer has some idea of his picture's purpose should he consider actually taking a picture. His aim well established, he has many choices of control over the finished product, through proper selection of film, lens, camera position, lighting, exposure. These possibilities are explained in the second part, "Control When Taking the Picture."

And since many a fine photograph dies a'borning because of poor negative processing either by the photographer or a photo-finisher, the third part of the book is devoted to "Control When Processing

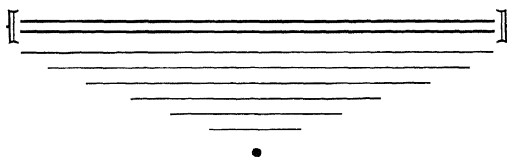
A GUIDE TO PHOTOGRAPHIC CONTROL

the Negative." Therein various methods of development, intensification, reduction, and retouching are offered. Those who do their own darkroom work will find help in this material, and those who have someone else do their developing can use the information as a guide in evaluating the results of those who pose as competent photo-finishers.

The fourth part of the book is devoted to "Control When Making the Print," important in making full utilization of the negative. The importance of maximum control in print-making is apparent to those who realize the limitations of sensitized paper (even when handled by the most expert photographer) to include all the tones in a negative. While it is certainly true that a good negative is required for a good print, it is also true that the final picture is no better than the print. With all other factors under control, there usually remains room for improvement in print-making.

Methods outlined in this book are not the only ones available to the inquiring photographer, yet with the hundreds of variations possible through the extensive choice of controls herein explained, he should be able to make satisfactory photographs for some time to come.

A GUIDE TO PHOTOGRAPHIC CONTROL



THE PHOTOGRAPHIC CONCEPT

PHOTOGRAPHY is the most modern of all modern forms of communication. With it, time is made to stand still and space is bridged. We see the battlefield of Gettysburg alongside the pennant-winning play of today's baseball classic. We send the Eiffel Tower anywhere in the world through television, and today's *New York Times* to Honolulu by means of facsimile reproduction. And all this is merely the expansion of the basic principle of the box camera.

Unfortunately for photography, it is very easy to make a photograph—a sort of photograph, anyway; and man being what he is inclines toward the easy and commonplace and acts without thinking. In at least one country of the world—our own—picture-taking has become a form of sport, a recreation; and since it requires at its minimum little more than the pressure of the finger on a lever, it probably has the highest percentage of audience participation of any form of outdoor recreation.

Since most photography is indulged in for personal satisfaction, participants are generally content not to question the quality of the results. In most cases, standards are low. They certainly are apt to be much lower than those set by publishers or exhibit judges (and these are considerably higher than the standards of work accepted by the average purchaser of an average studio portrait).



Fig. 1

"ATLANTIS" is a photographic satire on a well known legend of a woman who lost a race because she stopped to pick up an apple tossed in her path by her male competitor. The symbol on the apple implies that the prize fruit was wormy!

CONTROL THROUGH IDEA

We recognize the value of photography as a recreational medium, but there is another and more important phase for the serious photographer: that of communication. To paraphrase Moussorgsky, we might say that photography is not an end in itself but a means of addressing humanity. Through light, visual reality exists; and through lights, action, film, and paper, the reproduction of the visual reality is made to exist. The true purpose of the photographer, then, is one of communication, sometimes of translation or interpretation.

The photographer may take the attitude of an introvert communicating only with himself, or become an extrovert and attempt to project his communication, through pictures, to others. This book is concerned primarily with the extrovert and with photography as a means of communication to society. This involves not only ideas, but the development of ideas into pictures which make fellow men laugh and rejoice, cry and sorrow, pity and love, anger and fight. Well-planned, well-exposed, well-processed photographs wherein the photographer exercises certain controls over his medium are as truly (and often more impressively) communicative as are the symbolic words, phrases, and idioms that form the sentences which communicate a writer's thoughts or observations to the reader.

The purpose of the photograph can be one or a combination of any of the following:

1. *Straight Communication.* Here the photograph is principally a record of the visual observations or the impressions of the photographer. Examples of this are the ordinary snapshot of Aunt Minnie, news and feature pictures, atmospheric pictures for exhibits wherein the photographer's principal purpose is to share his observations with the viewer. Most commercial photographs come under this classification.
2. *Instruction.* In this the photographer uses his picture as a means of teaching or explaining. Science magazines, women's

A GUIDE TO PHOTOGRAPHIC CONTROL

magazines, and home and garden magazines are full of how-to-do photographs. Visual-aid pictures are filed in this classification.

3. *Entertainment*. These are photographs agreeably occupying the viewer's attention though they may not always be amusing.

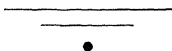
4. *Escape*. These photographs seek to give a reader vicarious thrills by transporting exotic and faraway places to him. Travel photographs are the best examples of such, and are more and more in demand by publishers. But while travel pictures may be a means of escape for one, another may find escape from his humdrum existence by reading pictures which transport him (yet at a safe distance) to the scene of a bloody crime, an accident or a fire.

There is another, smaller classification which should be considered: *Abstraction*. Often an abstraction is a kind of exercise for the photographer—for his entertainment only. In producing an abstraction, consider it as something to be created without regard to specific application. It is much like a tone poem, which, having no words, leaves the listener to think his own thoughts while he is listening. The music establishes the mood but tells no particular story beyond that which each individual listener interprets for himself. The literal-minded person most often does not understand (and therefore does not accept) an abstraction, since it does not appear to him to be logical or truly representative. He must learn that an abstraction is something to apply to one's own needs and associate with one's own life without trying to interpret the creator's intention.

Photography, in one sense, may be regarded as an imitation of nature. It is a deception by which objects in three dimensions are represented in two dimensions by means of tonal line, light and shade, and (in the case of color-process) by color. We begin by taking nature's own forms for models, and through manipulation of our equipment reproduce these forms in photographs. And as the pho-

CONTROL THROUGH IDEA

tographer is controlled by his tastes, likes, dislikes, sympathies, and prejudices, he thereby projects himself to interpret nature. The kind and degree of control used depends upon the photographer's approach to his subject matter. Taste, Intuition, and Experience are his assistant cameramen.



APPROACH

Due to the peculiarities of the controls available to a photographer who can in a measure project himself to interpret nature, there are five possible approaches to the making of a photograph. The photographer may express himself as a Realist, an Idealist, an Impressionist, a Classicist, or a Surrealist. Through his expression, then, truth can have as many aspects in photography as in morals or philosophy; and each approach has a specific criterion for the photographer's guidance.

As a *Realist*,⁹ he works to imitate nature closely; nothing altered, nothing concealed. He deals with all things from ants to skyscrapers in their natural state. His pictures are lifelike, usually without special spiritual feeling, and free from prejudices or convictions. They do not attempt to reflect what the photographer might think the subject looked like or what it means to him, but are clinically perfect imitations.

As an *Idealist*, the photographer sees the subject with the eye of a poet and philosopher, and his own vision is modified by the highest conviction of the subject's possibilities. His photographs are the visionary, perfectionist type in which idea predominates. The entire external perception is restricted to the idea.

The photographer whose viewpoint is that of an *Impressionist*

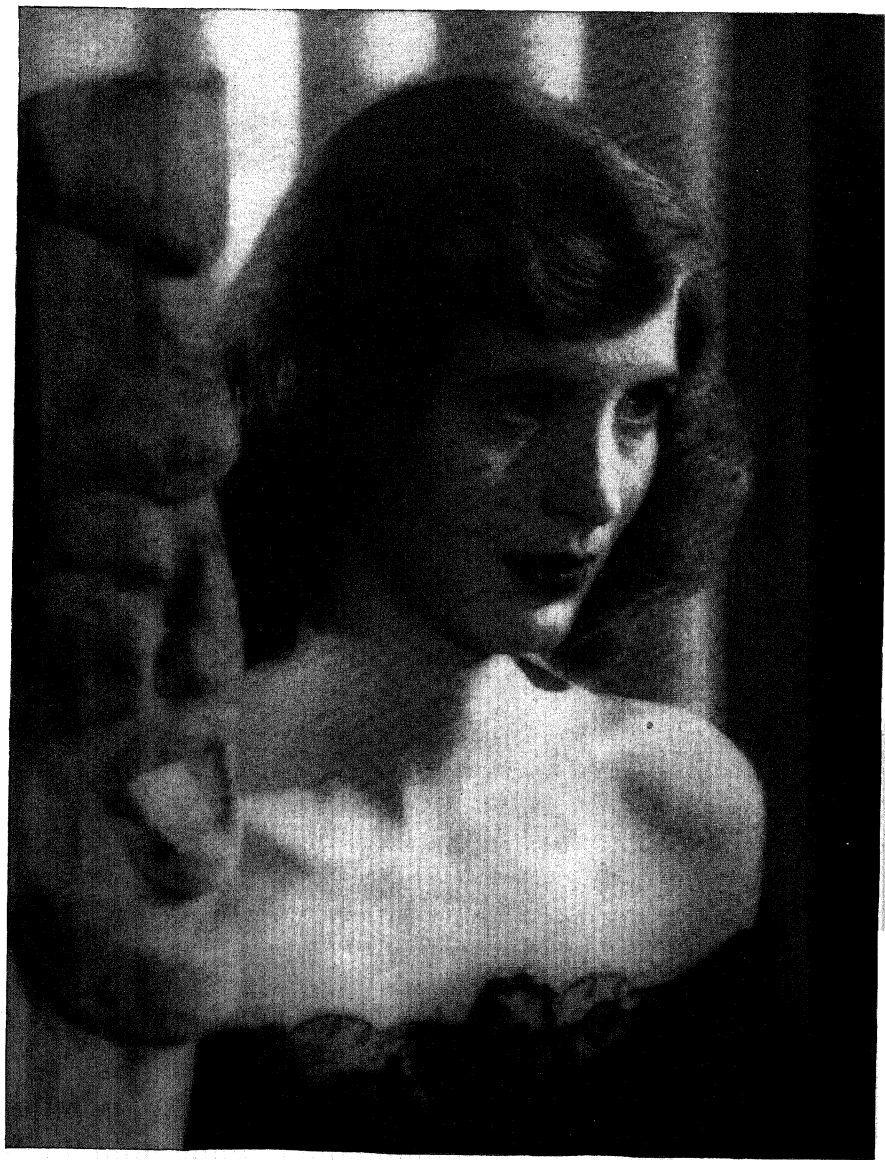


Fig. 2

The variable concepts in photography are emphasized in this photograph and the one on the opposite page. Both pictures are of the same subject, only the treatment is different.



Fig. 3

The newest and oldest processes are used in this portrait. It was made by laying a bridal kerchief, grains of rice and stalks of wild oats on the enlarging paper while the portrait negative was being printed by projection.

A GUIDE TO PHOTOGRAPHIC CONTROL

strives for all-over atmospheric tone and effect in his pictures. He is not concerned with the elaborate detail of realism. The photograph appears as if all the details were considered with equal emphasis, and the change of focal point by the reader does not alter the effect.

The *Classicist* photographer displays a clear, single, harmonious style of admitted excellence. High standards are consistently his.

The *Surrealist* photographer portrays a conscious feeling of dominating time and space. Certain objects appear in needle-sharp focus regardless of their apparently irrational organization. When his role is that of Realist, Idealist, Impressionist, or Classicist, the photographer thinks objectively; as a Surrealist, he thinks subjectively or psychologically.

Now and then a photographer attempts to be a purist in one of these categories. This is difficult. As has been mentioned, a purist is one who avowedly uses no controls in making a picture. But the *id*, the natural instinctive impression he has of the subject, will, in spite of him, dominate his feeling for and his photographic approach to the subject. We all look at nature with certain preconceived notions, and like children we change our viewpoint with age and maturation.

The photographer's personal background cannot help but influence his picture-taking. It is a good thing for the serious photography student to gain a thorough background in humanities, social studies, psychology, and philosophy. And these subjects should be pursued throughout a lifetime of picture-making.

Though proper approach is a highly controlling factor in a good picture, attitude of mind provides philosophical approach only and does not dictate a choice of subject. Too often a philosophically perfect job of picture-making is done on a subject unworthy of the effort. This is perhaps one of the greater weaknesses of pictures sent to salons.



SUBJECT CHOICE

Choice of subject is of prime importance to the photographer's chances for approval or rejection of a photograph. Just as a speaker should have something to say before he assails the ears of his audience, so the photographer should have something worthy of his audience's sight. Many technically fine photographs appear in every exhibit but go almost unnoticed because of weak subjects. These purely technically good prints are seldom accepted by editors. Photographers should remember that pictures are more often judged for subject matter than for anything else. A fine print of a poor subject may attract attention from other photographers, but a good subject poorly photographed will attract and impress crowds. Technical quality alone will not demand or hold interest. Well-chosen subject matter *plus* technical quality is the goal we hope to achieve.

The subject should appeal to the senses, the intellect, and the morality of the reader. There are those who claim that any picture that appeals to the senses is purely temporal—of no lasting value. Only subject matter, these critics say, which appeals to the spiritual man makes a picture immortal. This may be true but, as in every other art form, immortal pictures are rarities and seldom are seen in such light during the lifetime of the creator.

If the photographer would make a living at his photography he must produce photographs which do appeal to the senses, because his customers are human beings who live sensorially. The more of the senses a picture appeals to, the more successful it will be on the market. Intellectual or moral pictures have the greatest latent appeal. Yet when a photographer reaches that stage in picture-making when

A GUIDE TO PHOTOGRAPHIC CONTROL

his photograph of a sliced onion makes the observer's eyes water, he has become truly a photographer.

Art is human expression and its appeal is to human nature. We accept that which comes within the range of our experience. We more often judge emotionally than intelligently. Therefore, the wider our experience, the more receptive are we to a wide range of subjects. A situation twangs our heartstrings because our senses have previously been tuned to similar subject material. It is like the affinity between the A-string on the cello and the A-string on the piano. Twang one and a series of vibrations are sent into the ether which, when they reach the same string on the other instrument, create a duplicate audible vibration. But unless both are in perfect tune this responsiveness does not exist. So with the human mind—untuned it does not respond to the stimulus of the most wonderful of subject material.

Sensitivity is created out of association with all the wonderful things in the world, whether they be iridescent dragonflies on a pond weed, the words of a philosopher, or the beads of foam on a freshly drawn glass of beer. To produce photographs which appeal, we must have an understanding of and an appreciation of man and his environment.

•

DEVELOPMENT OF IDEA

Photographers need to stop apologizing for photography for what it isn't and proudly prove what it is. The premise that photography is a form of communication does not mean that it is literature in disguise, or that it must be a translation of the work of another. The manner in which the photograph is made reveals whether the sub-

CONTROL THROUGH IDEA

ject is the servant or the master of the picture situation. We know what happens when photography is used to imitate a literary form—the resulting pictures are usually melodramatic and theatrical delineations of *Evangeline*, or something equally sentimental. The well-known composite photograph “Fading Away,” by H. P. Robin-



Fig. 4

A few travel posters, a railroad schedule, a couple of books and a traveling bag in proper association with a model were all that was needed to make this magazine cover. The proper arrangement of the picture elements provided the composition that made possible a visual representation of an idea.

A GUIDE TO PHOTOGRAPHIC CONTROL

son, is an excellent example of this. Photographs should incorporate story-telling qualities, but this should be done on the basis of photography, not literature.

A readily available control for the development of idea is the study of literary forms as source material. Writers use words as symbols; therefore the products of writers will constantly reveal new thinking processes. Thus, he who feels the emotional stimulus of reading good literature will find that his subjective thinking influences his objective photography, and he will make more interesting contributions to the craft.

All forms of good literature—article, letter, drama, essay, short story, biography, novel, poetry—whether they be fiction or documentary are stimulating. They help extend the experience range of an individual.

There is relatively little difference between a topflight photojournalist and a dramatist. Both are concerned with human behavior. The dramatist holds his conflicts within the borders of the proscenium. The photographer sets forth conflict within the white borders of a sheet of paper.

The poet has a special problem which the photographer might well consider. He is held to a rigid economy of words. Every word must count; each one must carry the fullest possible meaning. Organization in both poetry and photography is almost as important as the theme.

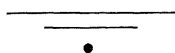
In some instances, the content of a literary piece may suggest photographs. In others, the deductions you have consciously or unconsciously made while reading may stimulate new ideas. You may even catch photo possibilities in a title. Or you say to yourself, "Does it have to be that way?" There is an entire chapter on this source of ideas in the author's *Free Lance Photography*. That discussion deals largely with the objective approach to the adaptation of literary

CONTROL THROUGH IDEA

forms to photography. However, the greatest possibilities are those associated with the subjective approach, which comes not from a literal translation of literature into photography, but from using literature as a fuel for getting your plane of thought soaring. Once in the air you travel on the free energy of independent thinking, guided by technical control.

Philosophy, religion (without dogma), social problems, all are good background reading. The astute photographer is something of a philosopher in his own right as he displays his love for wisdom and photographically deals with causation. If he has a broad and sympathetic understanding of his subject, this fact will be reflected in his photographs. The greater his wisdom and his control of photographic equipment, materials, and processes, the less obvious his conscious efforts will appear in the finished photograph.

The challenge is great for the photographer to be familiar with the conditions of men. Let man cease to contemplate his navel and respond with interest, sympathy, and understanding to the neighbor next door, the occupant of the house at the edge of town, the citizen of Timbuktu.



IDEA INTO LAYOUT

The next step in making your photograph includes carefully selecting an appropriate theme and developing it into a master plan, the Big Idea. This is a conscious procedure and not something born of inspiration. The success of this method is probably best demonstrated by advertising photography.

Idea, or pattern, is likened to an architect's plan—it shows the thing to be aimed at. Naturally there must be considerable flexibility



Fig. 5

Discarded flats from a theatrical production furnished the properties for this fashion shot. This use of the flats and a crisp spotlight help convey the idea of the woman of fashion being "on stage."

CONTROL THROUGH IDEA

in a plan for a photograph, but willy-nilly shooting in hopes that something usable will come if enough exposures are made is hardly a success expedient. Put the idea down on paper in a few sentences, or rough sketches, or both. If you can express it in this manner, the chances are you can express it photographically. Plan the emotional effect you wish to convey in the finished print, and determine the best possible manner of achieving it through posing, lighting, camera position, lens, filter, film, exposure, negative, and print-finishing. Don't be satisfied with "off-the-cuff" decisions. Study your plan for any improvements; question and weigh.

Unconscious selection in the development of an idea is unavoidable because of an impulse conditioned by your background, including habits, environment, reading, and other experiences. This first impulse, therefore, may not be the best one to follow. Developing the idea is seeing subject matter in a number of different aspects, so that the most effective one can be selected for the plan of action. You may, after final analysis, select the first suggestion that came to mind, but unless you are a genius, the first impression will not always be the right one.

With the idea completed, there is another step toward control. It is your prerogative to direct, through commanding or restraining action. This includes the arrangement of the picture elements, and is commonly called *composition*.



THE UNITY OF VARIETY

Composition, the mechanical means of putting together, of unifying the elements of a picture, is a powerful component of control. This arranging of picture elements materially aids the photographer

A GUIDE TO PHOTOGRAPHIC CONTROL

to convey more effectively the sense of his picture. And the study of composition is almost limitless. As your concept of space and form and quality is broadened, the potentialities of conscious composition will become increasingly apparent.

Once the idea is selected and arrangement of the picture elements begun, the photographer must have singleness of purpose. If more than one idea is to be conveyed, as in the case of a pictorial essay, a series of photographs, each with its own particular idea, will be made.

Balance is a basic and relatively safe means of organizing space and form and quality within the borders of a picture. This balance includes a definite relationship between light, shadow, tonal line and plane, so as to convey a definite point of view, a feeling of perspective and space perception.

Line

Line is a painter's device for unifying the elements of a picture and at the same time helping to create an emotional effect while leading the eye to the center of interest. In a photograph, a line is not always as sharply defined as in a drawing, because the photographic line is made up of many tones. Here are some emotional effects that may be achieved by specific line uses:

1. *Vertical line.* Dignity, solemnity, height, strength;
2. *Horizontal line.* Solidity, earthliness, peace and restfulness;
3. *Diagonal line.* Action, speed, excitement, movement; the more slanting the line, the more motion implied. The diagonal line can, however, be slanted so far as to become unbalanced and allow the subject to "fall on its face";
4. *Straight line.* Vigor, vitality, strength, stability, security, piety, masculinity. Overuse of the straight line tends to melodramatic feeling;

CONTROL THROUGH IDEA

5. *Curved line.* Weakness, femininity, restlessness;
6. *Nervous line.* Movement, restlessness, frustration.

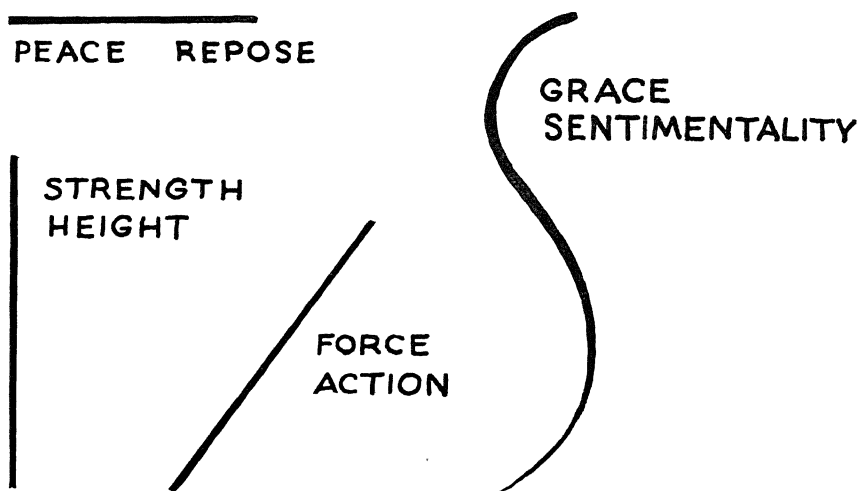


Fig. 6

LINE is indicative of feeling. Note how these lines are used in several of the illustrations in this book.

The Hogarth *line of beauty*, commonly referred to as the “S curve,” has dominated pictorial photographs for so long that it has become a weak line and stimulates a feeling of sentimentality and saccharinity more often than grace and beauty.

It is possible, of course, to incorporate more than one type of line in a picture, but care must be taken to prevent a variety of tonal lines so completely dominating a picture that confusion results.

Composition in color is more closely related to tone and mass than to line. Whereas strong line can be suggested in monochrome, even to the use of heavy tonal line, in color-work it is mass color that is most effective in composition, so there is the added necessity of being conscious of color tones and their relation to one another. Simplicity is the key to good and effective color composition. The picture should give the feeling of brilliance, of a general, overall glow of light, ac-

A GUIDE TO PHOTOGRAPHIC CONTROL

cented by highlights. Colors have inherent motion—those in the red-yellow range seem to advance; those in the blue-violet range, to retreat.

There is considerable difference of opinion among writers and lecturers on what constitutes composition. Some even claim composition can come only from within the composer, and therefore that no rules can be set up for the neophyte. This seems much like saying Mozart just up and composed. No credit is given the background and

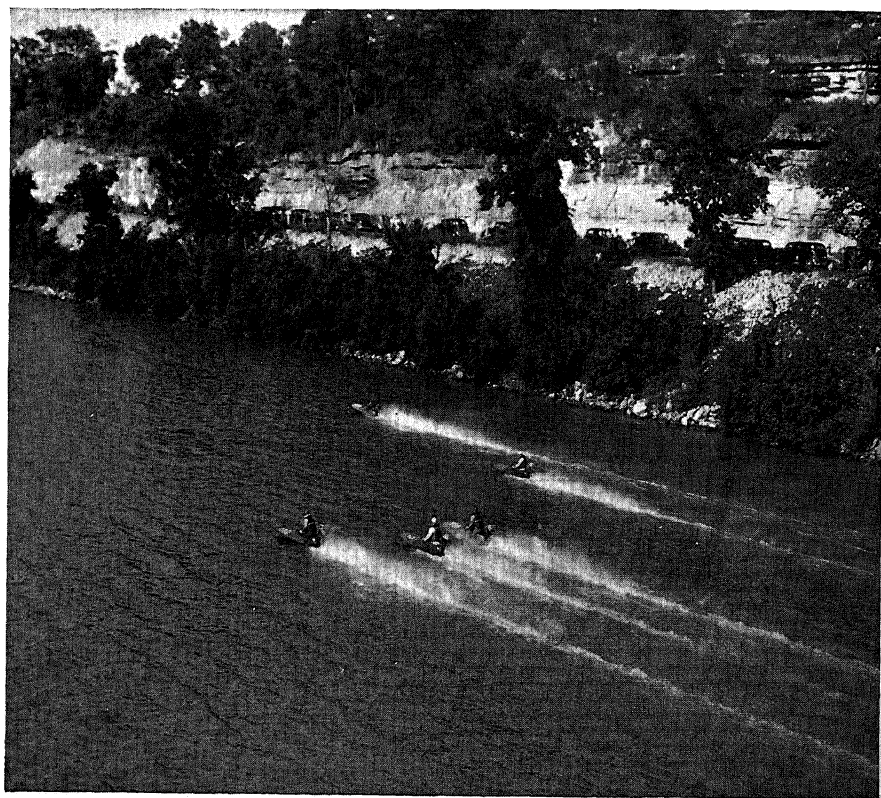


Fig. 7

Diagonal movement of the outboard motorboats creates a greater feeling of speed than if their paths followed a plane parallel to the picture's border.

CONTROL THROUGH IDEA

training and the observance of traditional fundamentals of composition that went into his scores. Therefore, while agreeing that the ultimate in composition is yet unknown and may be inspirational, approach the learning of composition in photography by considering the well-known and equally well-accepted traditional forms. These traditional approaches (largely nineteenth-century ones) are the L- or right angle, circle, triangle, S-curve, scales (balance), cross, and radii.



Fig. 8

OZARK TRYSTING PLACE with its horizontal lines implies a quiet restfulness. The backlighting of the figures in the center of the picture causes the background to recede.

A GUIDE TO PHOTOGRAPHIC CONTROL

These seven traditional forms of composition have been in use long enough so that a picture set up on the basis of any of them should be acceptable to the average beholder. Likewise, as most art editors have been trained in the academic approaches to composition they readily recognize and comprehend the utilization of one or more of these traditional forms. Learn these simple forms of composition but do not consider such a meager knowledge sufficient.

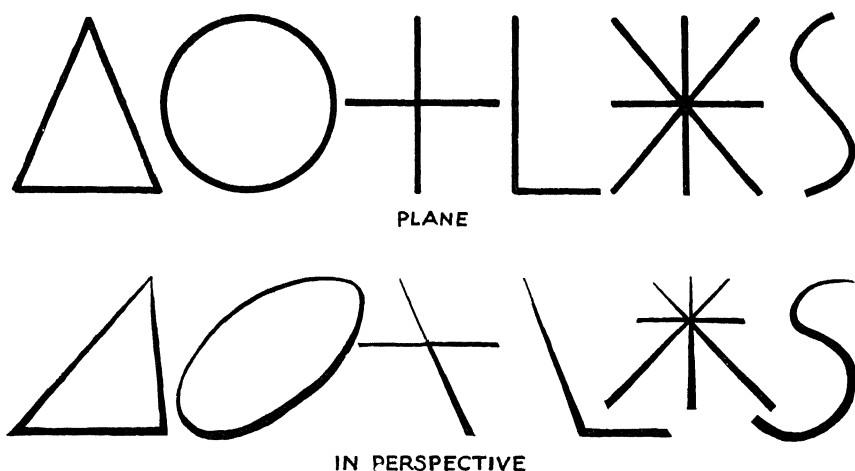


Fig. 9

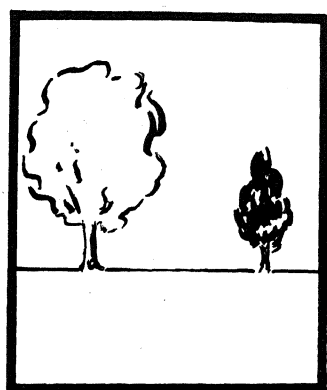
These symbols, with the scales or balance (Fig. 10) constitute the basic forms of the seven traditional composition devices. They may be used singly or in combination with one another and while safe to use as guides for composing a picture they do not represent all there is to be learned about composition.

There are several books on photographic composition. Their main weakness lies in the fact that they lead readers to accept given precepts as complete, and too often to cease exploring more intricate forms of composition or experimenting with new possibilities. Such books encourage the limiting of the possible by the known.

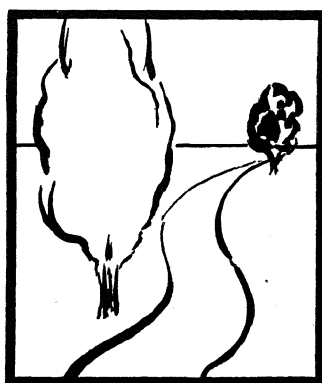
As a kind of rule-of-thumb plan for basic control, begin by examining a scene through a frame, since in its finality the photograph

CONTROL THROUGH IDEA

will have a definite border, either the white border of a print or mount, or a frame.



PLANE



PERSPECTIVE

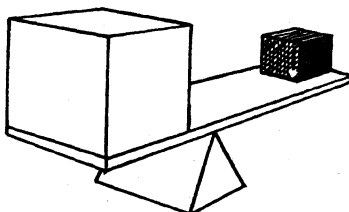
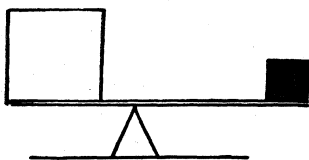


Fig. 10

BALANCE is achieved by "weighing" one object against another. In this illustration notice how tone balances volume and how balance in plane is static while balance in perspective creates motion and increased interest.

The use of space as a compositional device has interested workers in the graphic arts for centuries, although their approaches have not always been the same. However, most authorities up to the present have agreed that good composition considers the following:

1. Appearance (a two-dimensional approach)—what the eye sees physically;

A GUIDE TO PHOTOGRAPHIC CONTROL

2. What the eye imagines—the reality made up of appearance and a knowledge of the subject;
3. Deeper emotional image—the photographer's idea of the subject conditioned by his sensitivity to it.

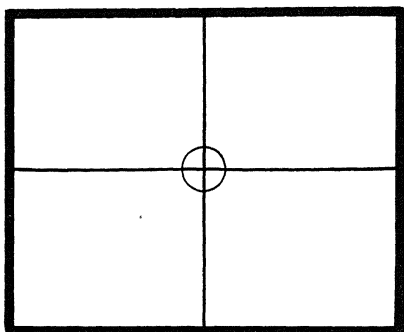


Fig. 11

Avoid centering the principal point of interest in your picture unless you want a static and uninteresting effect.

A simple mechanical approach to composition in photography is to divide a ground-glass viewer into thirds vertically and horizontally (Fig. 12a). Any of the four circled points, at which the lines cross within the picture space is best for placement of the subject or point of emphasis. This plan is based upon the traditional "Golden Oblong" of the Greeks—a rectangle with an approximate 8 to 5 ratio.

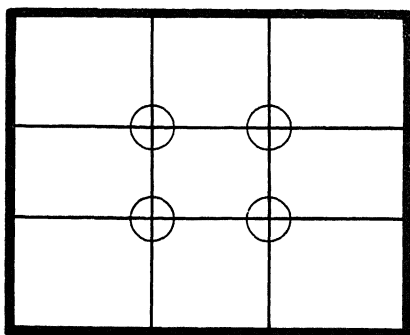


Fig. 12a

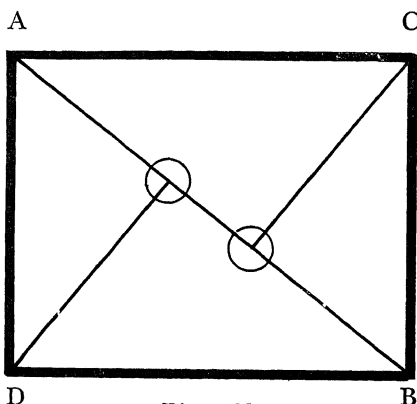


Fig. 12b

Principal points of interest may be located at any of the points indicated by circles in these illustrations for pleasing composition.

CONTROL THROUGH IDEA

Another approach (Fig. 12b) is to divide the picture area by running a diagonal line from the upper left corner to the lower right corner (A-B), and extending a line from each of the other two corners (C-D) to make a right angle with the diagonal. Place the center of interest at points indicated by circles.

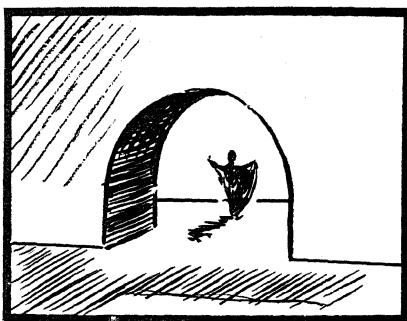


Fig. 13

Notice how framing devices such as tree trunks and branches or archways add perspective to the pictures.

A convenient device for creating the illusion of depth in a picture is the frame, provided by an archway, a tree trunk, a leafy bough. The border of the print acts as a kind of frame or boundary of the foremost plane (though often a weak one); a strong foreground helps emphasize receding planes. Thus a single object in the foreground tends to move forward from the background (Fig. 13), while objects placed at or near the edges of the picture create the illusion of a receding center area.

It must be noted, however, that the tone of the objects in the foreground is of considerable importance to the success of the illusion. They should be dark in tone and not reveal too much texture, lest they compete too strongly for attention.

Some other rules of thumb to carry a photographer through at least his swaddling days of composition are:



Fig. 14

SPRING LIGHT makes use of play between light and dark areas with the low key treatment of the man's figure giving emphasis to the high key treatment of the girl's face.

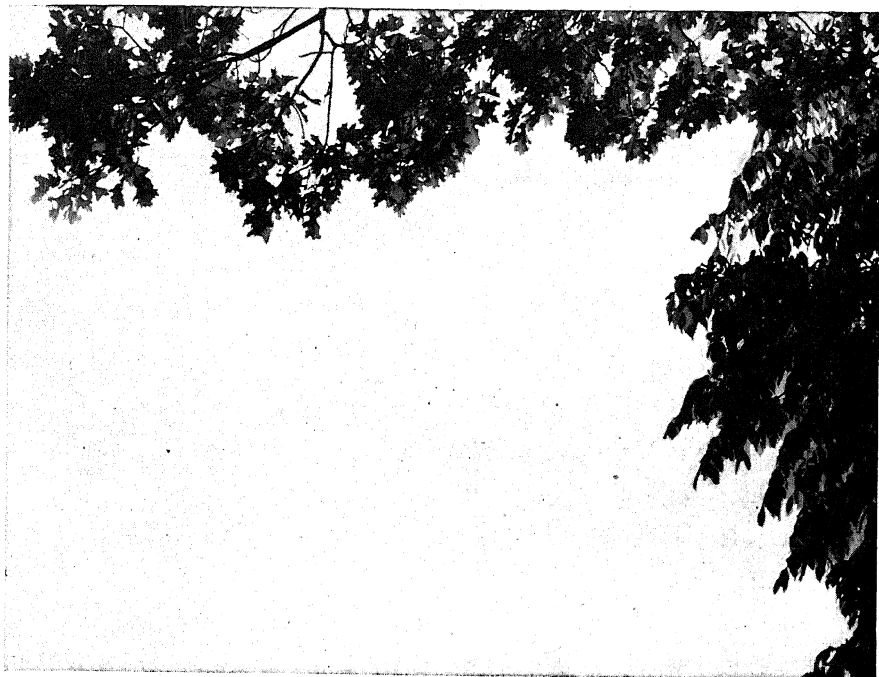


Fig. 15

This is a print from a stock framing device. It was made by taking a negative of tree branches and intensifying the sky area with new coccin dye. In use, this negative is placed in the enlarger and an exposure made on the enlarging paper. This negative is removed for the enlarger and the principal negative placed therein for the final exposure. In some instances the framing device can be made by completely reducing the sky area of the negative with a chemical reducer and placing this negative in contact with the principal negative.

1. Avoid placement of textured subject against similar textured background;
2. Figures placed flat against walls or curtains tend to be weakened;
3. It is not best for good balance that all of the picture elements be equally attractive—with degrees of emphasis, create move-

A GUIDE TO PHOTOGRAPHIC CONTROL

ment from one part of the picture to another according to the emotional intention;

4. Let there be an emphasis of symbol as against the literal interpretation of nature;

5. Avoid tangents, such as the edges of circles touching lines, or background lines which radiate from principal subjects.

These give the effect of lines growing out of a subject.

Objects near the edge of a picture, when facing out, appear to move out of the picture (Fig. 16b), but when turned toward the center of the picture the illusion is given of movement in the other direction (16a). Also, since the eye tends to move from a darker to a lighter area, try darkening the edge of the picture. This causes the eye to move into the picture, rather than to follow its borders. The greatest point of contrast should coincide with the principal point of interest.

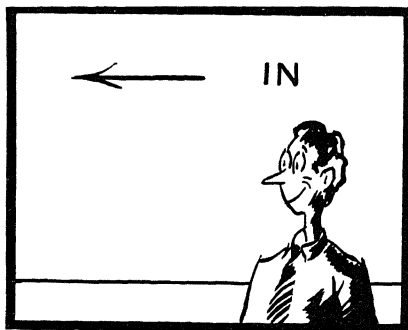


Fig. 16a



Fig. 16b

Movement and interest are kept within the boundaries of a picture when the subject faces into the frame as in the illustration at left. Avoid letting your subject look out of the frame, as in the illustration at right, if you would retain interest and unity within your picture.

Mass

Mass, which is the *quantity* of form holding together in one body, must be thought of as held together by line. It may or may not have

CONTROL THROUGH IDEA

plastic qualities that will allow remolding through the use of light and camera treatment, but it is still the element with which composition is chiefly occupied. This is especially true of subjects to be photographed in color.

Mass within a picture area can be made to appear larger or smaller through the control of camera lens or camera distance; it can be made to flatten into the background, or to suspend in space through light, change of tone by the use of filters, and by choice of film or negative treatment. Consider carefully the element of quantity and select the proper controls to be used. In monochrome photography, too, mass is interpreted in terms of tones, and the possibilities will vary according to the color of the subject and the amount of light falling upon it. These are the basic contrast factors.

In color photography the subject is adjudged in terms of mass color. It is not necessary to light specially for contrast, since color itself furnishes the contrast. Hence the double importance of considering mass in the mechanics of composition.

Some simple devices for analyzing line and mass when taking pictures are:

1. Rack the camera in and out of focus and study the pattern in the ground-glass;
2. View the scene with a blue filter (a piece of underexposed Kodachrome film is useful for this purpose);
3. Squint the eyes down to about "f. 22," eliminating most of the detail from what you see;
4. Hold the hands in front of the face, thumbs touching, so that a three-sided frame is formed. Move this frame back and forward, up and down, from side to side, and select the best view.



VISUAL SYMBOLS

Words are meaningful to us only in the measure that they are abstract symbols standing for realities. Photographs are so realistic that we do not always consider the elements of a picture as being more than a kind of real imagery. Perhaps it is because we are so conditioned by things standing for other things as well as their own reality, that we lose sight of their symbolic significance. A photograph of a turkey may be more than a mere photographic representation of a large, edible fowl. In America the turkey is recognized as a symbol of the Thanksgiving season. This has been the result of continued public use of pictures of turkeys in national advertising pertaining to the Thanksgiving season, and the bird's wide use as a meat dish for holiday fare. Because this public association of the turkey with the Thanksgiving season is largely confined to the United States, the bird is not a universal symbol. This poses a problem for anyone wishing to use a symbol of universal thanksgiving.

But public symbols are seldom universal. The triangle, for instance, in China represents man, earth, and heaven, and therefore stability; while in America the "triangle" connotes marital instability.

There is a long list of graphic symbols which, in the United States at least, have special public meaning:

Seed from which great things grow	acorn
Evil, deceit	adder
Struggle	facial agony
Temptation	apple
Patriotism, strength, courage	eagle

CONTROL THROUGH IDEA

Death (inescapable)	noose
Death	skull
Thanksgiving	turkey
Christmas (spirit of giving)	Santa Claus
Christmas (everlasting life)	fir tree
Pain, suffering, shame	cross
Marital instability	triangle
Easter (fantasy)	rabbit
Easter (purity)	lily
Easter (life, fecundity)	egg
Patriotism	American flag
All-seeing, discovery, entrance to soul of being	eye
Authority, magical qualities	wand
Life	tree
Life-giving qualities	cow
Fickleness ("daisies won't tell")	daisy
Strength	rock
Vanity	mirror
Learning, quest for knowledge	book
Luxury	diamond
Leadership	baton
Luxury, romance, sensuous love	orchid
Romance (tempered love)	rose
Romance (young love, tender but not as fervent as rose or orchid)	gardenia
Suggestion of the "clean-up"	broom
Life, passion	fire
Mystery	black cat
Plenty	barns
War, conflict	sword
Death and decay	bones

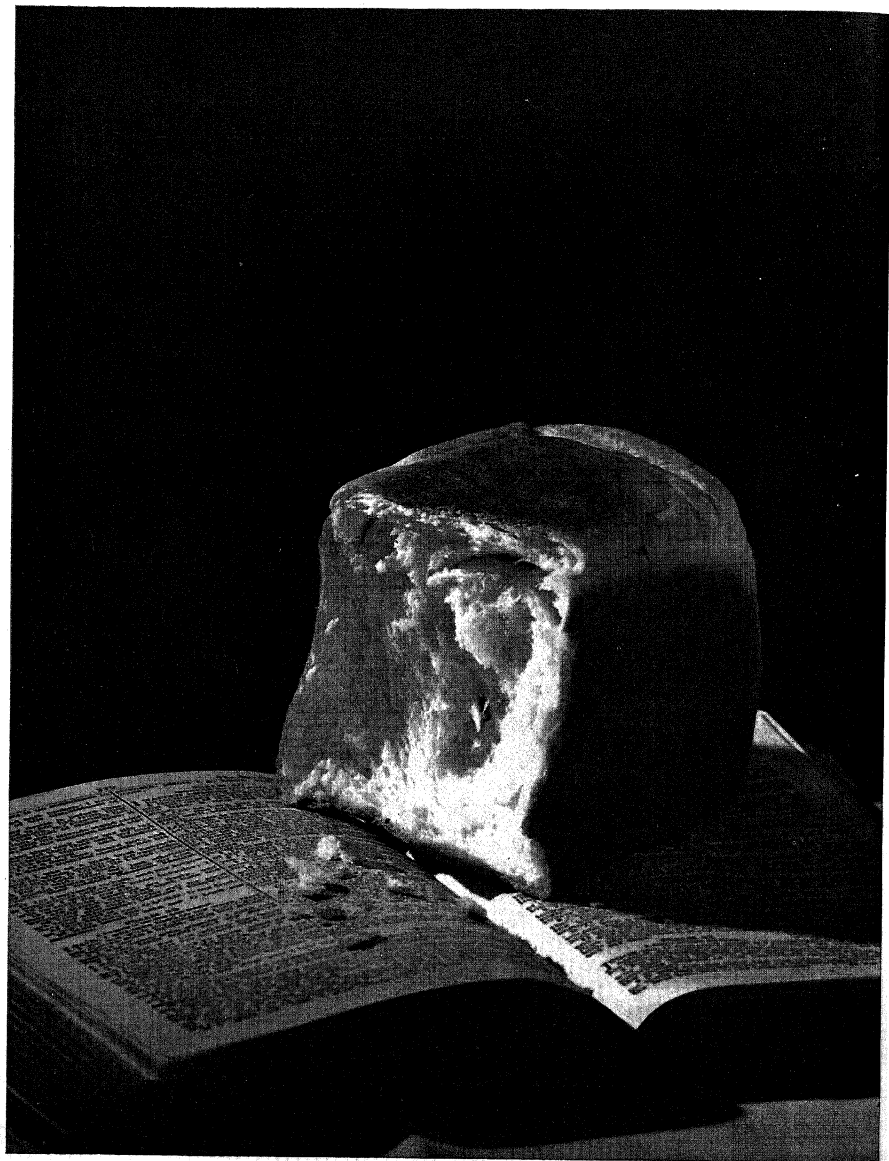


Fig. 17

Two objects, bread and the Bible, are combined to make this symbolic picture.

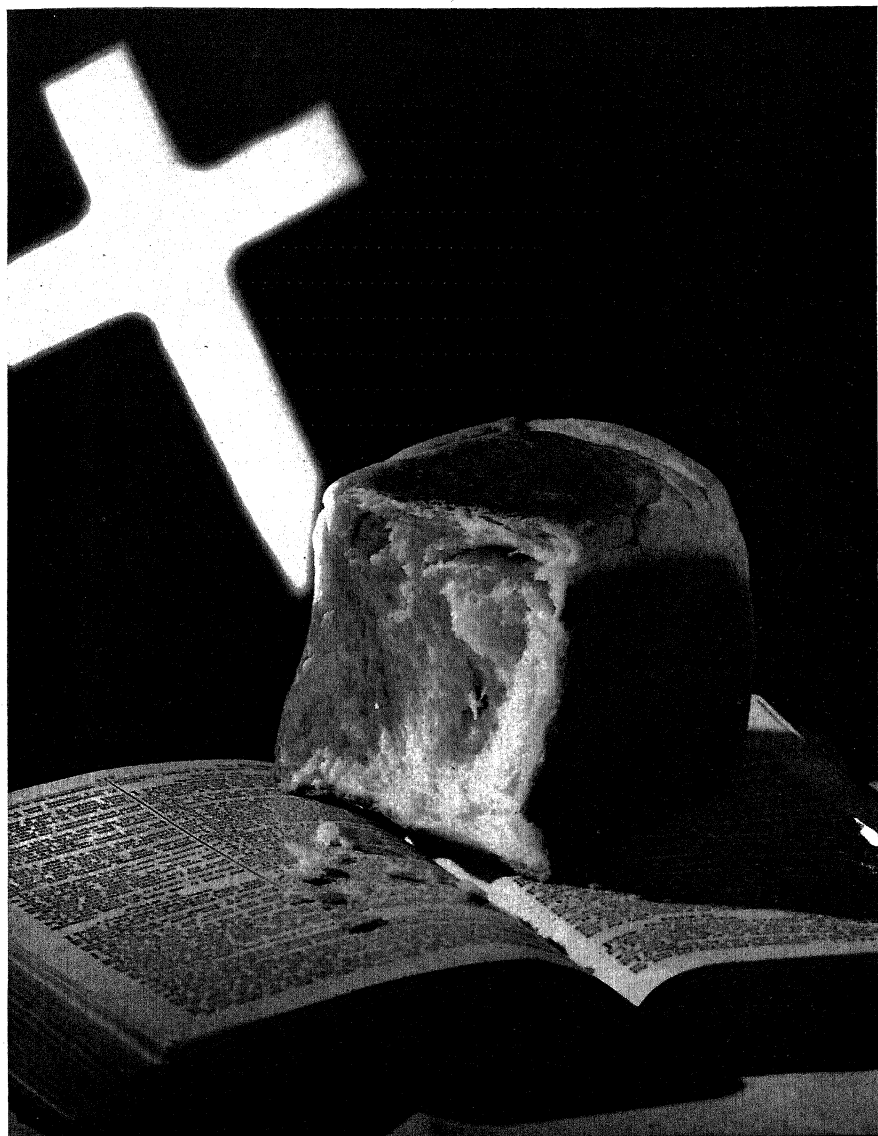


Fig. 18

The religious significance of the picture is heightened by adding another symbol—the cross—by means of a cardboard mask held in place over the enlarging paper during exposure.

A GUIDE TO PHOTOGRAPHIC CONTROL

Simple living	bread
Avenue of escape, adventure	bridge
Fickleness, frustration	butterflies or moths
Luxury	candy
Sturdy simplicity	pipe
Frivolity	cigarette
Luxury, Babbitry	cigar
Regality	crown
Gambling	dice
Stolidity, stubbornness	mule
Peace	doves
Knowledge, accessibility	keys
Courage, power	lion
Offensiveness	skunk

Gestures are also a form of abstract symbolism. They, too, are largely national rather than universally accepted public symbols, but often can be effectively used in photography. In drama, including opera, gestures and body attitudes are used to give emphasis and interpretation to the words and music involved in the abstract form. Delsarte, the great French pantomime, evolved a "system" of expression that strongly affected and was a forerunner of the silent-movie acting technique. Unfortunately, too many persons accepted the Delsarte system as an end, and their work became the mechanical gymnastics which today make "elocution" appear ridiculous.

It is a certainty, however, that the very attitude of the model's body can be strongly suggestive of mental or physical emotion. Observe how vulgarity and sensualism are implied when a hip is thrown out! Even a sweetfaced Raphael madonna would appear vulgar in such a pose. A sense of assertion is imparted when the model's knee is bent forward and the vertical axis of the body moved forward to



Fig. 19

The association of a piece of modernized religious pottery with a sheet of Christmas music provided the elements for a photograph that was used as a magazine cover and a greeting card.

balance the figure (the diagonal line). Single elements of a body can also suggest strong feelings and attitudes, as in the case of a hand's placement. The hand placed on the stomach denotes a vital physical feeling. The hand on the cheek, a contemplative or affectionate feeling. Remember "Romeo, Romeo, wherefore art thou Romeo?" and Romeo's "See, how she leans her hand upon her cheek."

Here are some basic attitudes which, used with judgment, help the body interpret and portray definite emotions or ideas:

A GUIDE TO PHOTOGRAPHIC CONTROL



Fig. 20

Emotions implied in sitting attitudes:

Despair

Timidity

Doubt

Earnestness

Vulgarity

Reflection

CONTROL THROUGH IDEA



Fig. 21

Body attitudes portray emotions:

Reverence

Humility

Courtesy

Prostration

Defeat

Recovery from defeat

A GUIDE TO PHOTOGRAPHIC CONTROL

1. *Kneeling*:

Reverence (kneeling on both knees) ;

Humility (kneeling on both knees, thighs back) ;

Prostration (kneeling on both knees, body thrown forward, face on hands) ;

Courtesy (kneeling on one knee) ;

Defense (kneeling on one knee, thigh back) .

2. *Lying*:

Utter defeat (lying on thighs, trunk down) ;

Defeat, but recovering from it (lying on thighs, trunk half-raised) .

3. *Sitting*:

Despair (sitting sideways on thighs) ;

Vulgar repose (sitting broadly, feet wide apart) ;

Primness and timidity (sitting feet parallel and together) ;

Doubt (sitting one foot in front, body poised between) ;

Earnestness (sitting one foot in front, body leaning over front foot slightly) ;

Excitement (sitting with one foot in front, body leaning very much forward) ;

Neutral emotion (sitting with one foot at side) ;

Calm reflection (sitting with body a little back, one foot in front) ;

Defiance (sitting with body braced back, retired hip forward, knee turned out with taut muscles) ;

Prostration (sitting, body falling back, forward leg extended, head drooping) .

4. *Standing*:

Vulgarity, intoxication, fatigue (legs wide apart) ;

CONTROL THROUGH IDEA

Condition of feebleness or sentiment of respect (legs straight, knees straight, heels together, toes out) ;
 Calm, strength, reserved force, reflection, controlled emotions (back leg straight and firm, forward leg with knee bent and with front foot near rear foot) ;
 Prostration, despondent passion (back leg with knee bent, front leg with knee straight) ;



Fig. 22
Respect

Vulgarity

Prostration

Vigor



Indecision

Defiance

A GUIDE TO PHOTOGRAPHIC CONTROL

Defiance, irritation, exasperation (both legs straight, feet slightly apart) ;

Vigor, animation, exaltation, excitement, advance (standing with all weight on front leg, back leg bent, ball of foot on ground but heel raised) ;

Fear, indecision, retreat (weight on back leg, body retreating) .

Hands, so often omitted in photographs, are frequently better indications of a model's true character than is his face. They are often highly expressive and can be used to add strength and directness to a picture. Watch people and see how they express themselves with their hands. Hands indicate strong negative or positive attitudes.

Have you ever noticed how the planes of a hand are used to convey certain feelings? Delsarte classified the planes of the hands: the palm as vital in nature, revelatory in expression; the back as moral or mystic in expression; the side as mental, indicative or definitive in expression.

These hand positions are revealing:

1. Thumb:

Approval (thumb of right hand up) ;

Disapproval (thumb of right hand down) ;

Disapproval and dismissal (thumb jerked back toward shoulder) ;

Signal requesting a ride (thumb jerked across body) ;

Vulgar expression of dismissal or scorn, extreme discourtesy to point of insult (thumb at nose) .

2. Hand:

Supplication (palm of hand upturned) ;

Benediction (palm of hand down) ;

Defiance (hand clenched and upraised) ;

CONTROL THROUGH IDEA



Fig. 23

The static qualities of a human figure in a photograph can be broken and the figure animated by interesting arrangement of the model's head, arms and hands, legs and feet. These pictures are adaptations of ballet poses, a device much used in fashion illustration.

A GUIDE TO PHOTOGRAPHIC CONTROL

Determination, forbearance (hand clenched at side) ;

Reverence (hands folded over breast) ;

Restlessness (tapping of fingers) ;

Disdain, scorn (wave of hand at wrist) ;

Benediction, farewell (upraised hand) .

“I should worry” gesture (both hands up) ;

3. *Clasped hands:*

Prayer, reverence (palm to palm, fingers upright) ;

Supplication (interlaced fingers, palm to palm) ;

Despair (interlaced fingers, palms separated and turned down) ;

Despairing struggle for control (hand grasping back of wrist) ;

Resignation (palm of hand laid on back of hand) ;

Powerlessness (palm to palm, fingers curved over hand) ;

Vital menace (right or index hand, palm up, starting gesture from back of head) ;

Moral menace (index hand starting from top of head, palm down) .

4. *Functions:*

To define (first finger prominent, hand moved up and down) ;

To indicate (first finger prominent, hand points to object) ;

To affirm (hand, palm down makes movement of affirmation up and down) ;

To deny (hand, palm down, makes movement of negation from side to side) ;

To detect (rub the thumb across the fingers as if feeling a texture between them) ;

CONTROL THROUGH IDEA

To conceal (bring the palm of the hand toward you, the fingers at the same time gently closing on the palm) ;

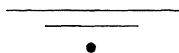
To reveal (reversal of above movement, exposing palm) ;

To hold (the hand closes as if to retain something) ;

To reject (fingers unclosed from down-turned palms, as if throwing something away) ;

To support (palm up, making a flat surface as if supporting a weight) ;

To protect (palm down, with a movement of fingers as if covering what you protect) .



SYMBOLIC COLOR

The emotional effects in a color photograph can be at least partially controlled through careful selection of dominant colors. For example: red may be considered as a symbolic color of love; yellow, of intelligence; blue, of power.

Special aspects of color are sometimes classified as follows:

1. *Yellow, orange, light-green*—mental;
2. *Scarlet, red-purple*—moral;
3. *Dark-green, violet, indigo*—physical.

Psychologists recognize both the symbolism and the personality revelation of color, and classify color preferences as revealing the following characteristics:

1. *Red*—vitality, generosity, courage, vigor, positiveness, fickleness;

A GUIDE TO PHOTOGRAPHIC CONTROL

2. *Maroon*—much of the quality of red, but tempered with caution and compassion;
3. *Pink*—gentleness, femininity, culture, sympathy;
4. *Orange*—love of life (the color of an extrovert) ;
5. *Yellow*—(the color of an introvert) well-controlled temper, secretiveness, intelligence;
6. *Green*—freshness, naturalness, tolerance, agreeableness, simple luxury;
7. *Blue-Green*—fussiness, orderliness, emotional coldness;
8. *Blue*—controversiality, dignity; a restraining or stabilizing color;
9. *Purple*—profundity, either real or assumed;
10. *Brown*—earthiness, dependability, sameness;
11. *White*—freedom, contentment, childlike qualities;
12. *Black*—dual personality, mystery;
13. *Gray*—soberness; conservative but not as stable as blue.

The photographer can make use of these color choices of individuals in association with character photographs, just as certain costumes aid in character delineation. Moreover, he may successfully use this knowledge of color analysis to stimulate given emotional responses in the viewer.



THE FINAL CHOICE

Although the bulk of the prints which come in endless streams from the photo-finishers need only to satisfy one person—he who clicked the shutter—no photograph is worth the film, paper, time, and energy unless it incites an emotional response from others. In the case of pictures for publication, there is a much wider audience to

CONTROL THROUGH IDEA

stimulate. Thus is seen the imperative need of being dissatisfied with low standards in photography, and of establishing some rules of comparison with good photographs. Then comes the question that has long been a subject for photographers' "bull sessions": "What is a good photograph?"

Those who have been in photography longest will agree that a good photograph has four outstanding characteristics that make it good:

1. *Choice of Subject.* To expose or not expose is entirely the choice of the photographer. Your own emotional reaction to a subject or scene is the first determining factor in deciding whether or not the subject is worth photographing. This emotional reaction will have been conditioned by your own experiences, including your knowledge of the humanities, social problems, religion, and philosophy.
2. *Conformity to the Original.* The appearance of the original, its authenticity and spontaneity, will be mirrored with close accuracy in the photograph. Hence all the controls are operative when the photographer puts his instruments to work. Lighting, exposure, lens, choice of film, development, and printing are especially important; each contributes to the achievement of conformity to the original.
3. *Quality.* Tactile and plastic quality must be present in a photograph if it is to be classed as a "good photograph." The overall tone quality must be good throughout a long scale of tonal values. Again, this is a completely controllable characteristic achieved through attention to all the steps outlined under conformity to the original, but with special emphasis on lighting, choice of film and filters, and proper development and printing.

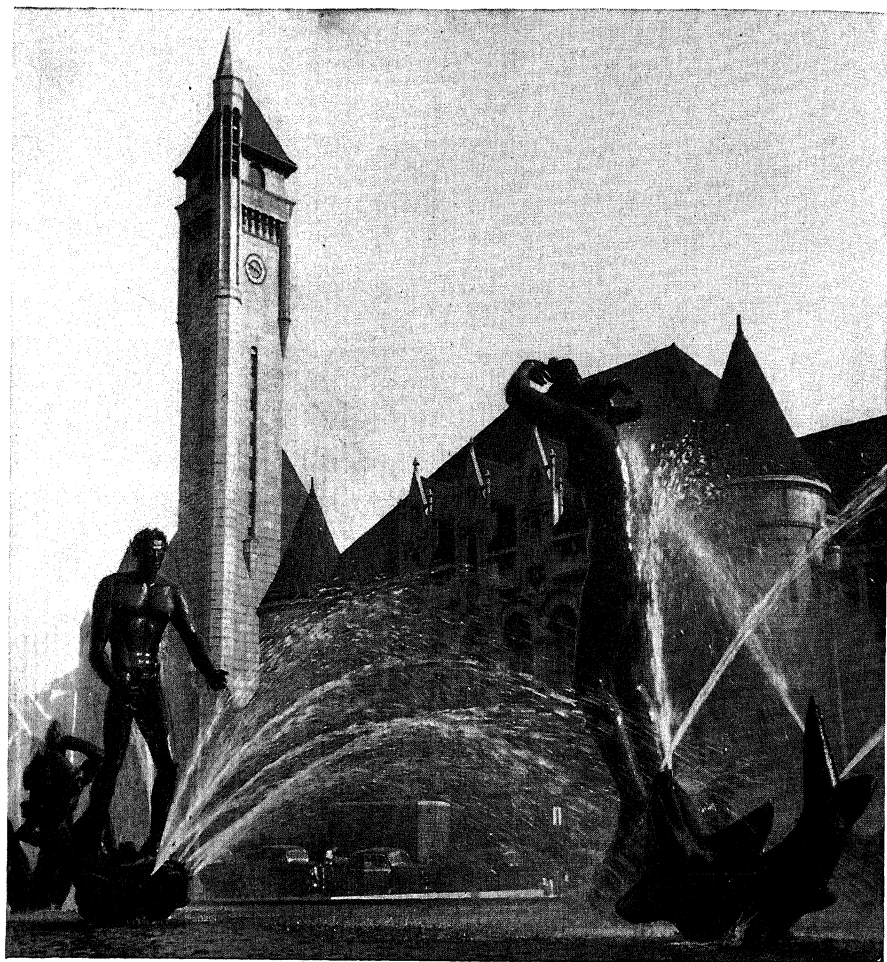


Fig. 24

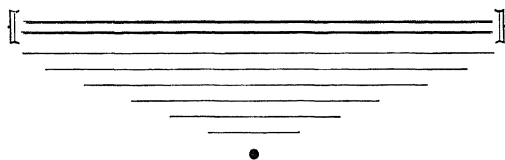
WEDDING OF THE RIVERS is an example of the balance or scales form of composition. Note also the strength of the vertical line of the tower in the background.

CONTROL THROUGH IDEA

4. *Sense of Space Perception.* This characteristic is not always as easy to achieve as the other three, but it undoubtedly will be of increasing importance, and the ambitious photographer must studiously cultivate his ability to see subject material in well-established planes. Having seen the original subject matter in its proper perspective, he must learn how to render these spatial differences by mechanical, optical, and chemical means. Principal controls for this will be camera position, arrangement, selection of lens and filters, and development and printing.

Important as each of these four characteristics is, it should be kept in mind that individually and of themselves they are not sufficient to a good photograph. There is a balance and interdependence among them that must be so closely related at all times, that whenever one is mentioned in this book, the other three may be considered present in a greater or lesser degree.

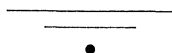
Each of the four characteristics of a good photograph is subject to controls, and the finished picture is the sum total of the photographer's application of the principles involved.



CONTROL WHEN TAKING THE PICTURE

EVEN the rankest amateur exercises some sort of control when taking a picture, if no more than to determine the direction he aims his camera. But what he does almost unconsciously can be done better through conscious effort. He has many and varied control choices in taking the picture, through selection of film, lens, filter, illumination, camera angle, exposure. Each choice deserves much consideration from the photographer, though he should not be so methodical in the use of controls as to rob the picture of its spontaneity.

Even newspaper photographers, who must often work at high speed, have opportunity for control. It is true that, working at high speed as they must, some of their use of controls is predetermined—standardization in choice of camera, film, illumination, and exposure. Yet even split-second decisions on camera angle, aperture, and shutter speed can be valuable aids, if the operator understands and practices until his techniques become almost instinctive.



SOME PROPERTIES OF LIGHT

The very basis of photographic control lies in understanding light, and the way its reflections record in light and shade on photographic

CONTROL WHEN TAKING THE PICTURE

film. "Things are seldom what they seem," says the poet; "and photography proves it," we echo. Seeing visually is one thing; seeing photographically, another. Manufacturers of sensitized materials are continually striving to produce emulsions which record light in the same tone as the eye, but until they reach such a goal photographers must learn to translate light into terms of photographic effect.

The human eye functions much like a camera, with lens and film,

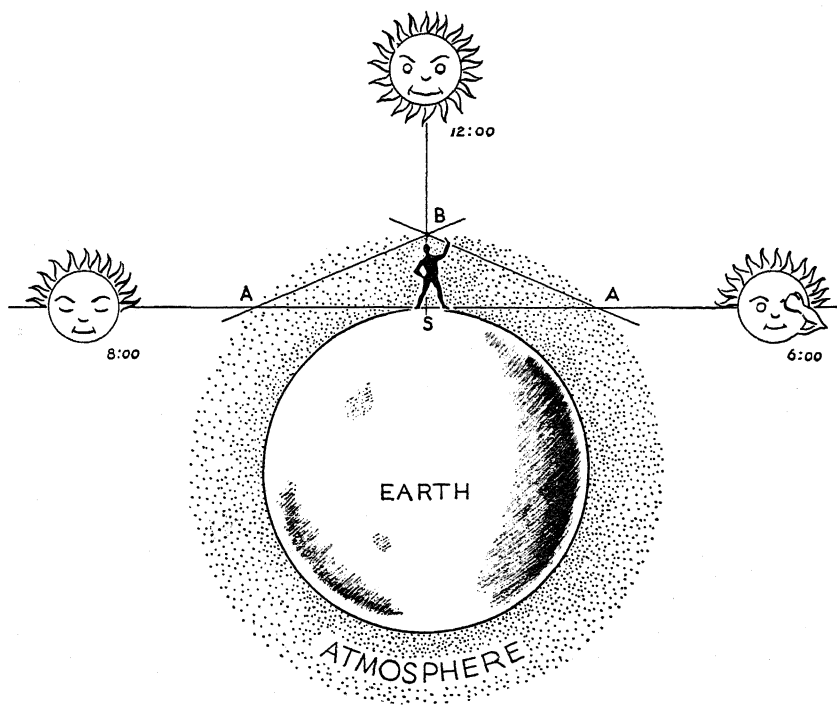


Fig. 25

Although the sun may be the same distance from the subject "S" at each sun-up, noon and sun-down this diagram proves that the distance light must travel through the atmosphere circling the earth is much greater at 6:00 and 8:00 (A to S) than at noon (B to S). Thus, as moisture particles and dust in the atmosphere refract and change the quality of light rays it is apparent why these changes must be considered when making photographs with films, both monochrome and color, that are balanced for noon time light.

though the retina of the eye possesses a sensitivity entirely different from that of film. This difference is less now than it was in the days of "color-blind" film, but marked difference still exists. An example: Our eyes are affected most strongly by yellow and green light rays, i.e., these colors appear brightest to us; yet until panchromatic film became available these light rays made little impression on film. On the other hand, rays which are invisible to our eyes, infrared and ultraviolet, produce a powerful action in all photo-sensitive materials.

In speaking of color and its photographic application, one must keep in mind two color ranges. The spectral color range, which is entirely visible to the human eye, includes those colors which are produced when a ray of light passes through a prism. The solar range includes all the spectral range plus infrared and ultraviolet.

Color as we think of it is a matter of reflection. When a ray of light leaves the sun it is "colorless" (to the eye) because it includes all the colors. As this solar ray strikes an object some of its elements are absorbed. That part which is not absorbed but is reflected, appears to the human eye as color. Red, for example, appears red because it is the part of the ray not absorbed but reflected. The total colorless light that fell upon the object contained ultraviolet, violet, blue, green, yellow, orange, red, and infrared. All the rays were absorbed, leaving only red, infrared, and ultraviolet to be reflected.

Another basic fact of color is that its registration is determined by vibrations. Light has an undulatory movement which spreads in all directions from a luminous body. The same classic example used to demonstrate sound and radio waves, tossing a stone into a quiet mill-pond, is applicable to color. Now if a handful of stones is tossed into a pond, a series of waves radiates, overlapping one another. Each wave has a crest and a valley, and the distance between crest and valley is the wavelength. These waves or vibrations register as color, and

CONTROL WHEN TAKING THE PICTURE

just as certain other vibrations, which produce sound, falling into certain classes may be given musical note-names, so the vibrations which create color are given names.

There are seven colors of the spectral range which concern us: violet, dark-blue, blue, green, yellow, orange, and red.¹ (Both blue and dark-blue are listed, since they have different characteristics photographically. Medium- and light-blue register almost white, and dark-blue registers black on the print.)

Light absorbed by an object may be considered to be complementary to that reflected by the object. White objects are said to reflect all colors, and truly black objects to absorb all colors. This process of reflection and absorption is important to both color and monochrome photography, and because the eye and film do not "see" exactly alike, the photographer must constantly practice light-judging exercises. His is somewhat like the task of the French horn player who has only the score for the baritone horn. It is essentially the same piece, but he must transpose.

When colors are reduced to monochrome through the photographic process, the result is a relative scale of gray tones, and it is important that a photographer be very familiar with this translation. A good basis for studying how your favorite film reacts to different colors is to make a gray scale in both daylight and tungsten light. Although a color wheel made up of solar colors would be the best to photograph for your test, such a wheel is not available. Use then an ordinary color wheel of visual colors, available at paint stores or art-supply houses. Make a normally exposed negative of this wheel by clear daylight, and another by tungsten light. Then make a good

¹ The color range given is listed in the order of the wavelengths of the colors; infra-red, which is too long, and ultraviolet, which is too short, are not discernible to us. We perceive red in the above example because our eye responds to the wavelengths between 400 millimicrons (millionths of millimeters) and 700 millimicrons; but our film, being sensitive to rays slightly below and above the range of the human eye, perceives something more—the infrared and ultraviolet.

A GUIDE TO PHOTOGRAPHIC CONTROL

print from each negative and mount these with the color chart on cards for study. If you use more than one kind of film you will, of course, make a gray scale for each different emulsion. Study of the relative values of color contrasts when reduced to monochrome will give you greater facility in control than twice the time spent in looking at reproductions from the salons.

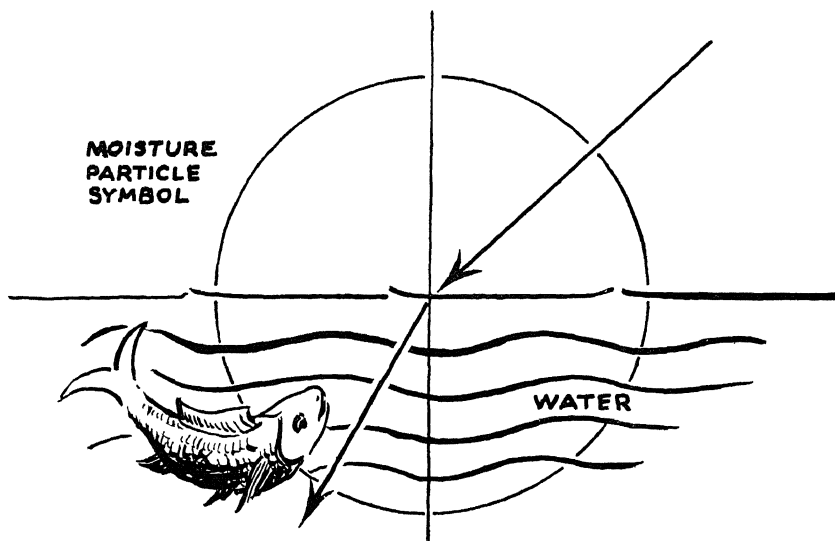


Fig. 26

This illustration demonstrates how light rays are bent when they pass from an area of one density to an area of a different density. This phenomena is known to every fisherman who has learned that his quarry is not where it appears to be. Just as light rays are refracted by large volumes of water so are they bent by the tiny moisture particles.

The differences one must recognize between visual and photographic recording include both optical and chemical differences. The eye is still a better lens than any man has been able to manufacture. Proof of this is seen in the fact that man can see readily by the reflected light of the moon, which is 200,000 times weaker than the sun, while very long exposures are necessary to get a moonlight pic-

CONTROL WHEN TAKING THE PICTURE

ture on even the fastest films. Chemically, the difference in sensitivity lies in the fact that chloride and bromide and iodide of silver, the commonly used photo-sensitive materials, are not as sensitive as the eye to the full range of colors. (Chloride of silver is very sensitive to violet, bromide of silver is sensitive to green, and iodide of silver to violet and indigo; mixtures of iodide of silver and bromide of silver are sensitive to both blue and green. Through the use of dyes in the emulsion, the range of sensitiveness to spectral colors is increased.)

Direct sunlight produces certain chemical effects which must be recognized and dealt with. The light of a blue sky, which is reflected sunlight, is chemically active and powerfully so on photographic emulsions through its blue color. This chemical action is strongest in summer, and about half as strong in winter. Early photographers, who depended upon solar light for both the taking and printing of photographs, had twice the problems of the modern photographer, who can at least have a stable light source, day and night, winter and summer, and can print from the incandescent illuminated contact-printer or enlarger.

Bright, white clouds increase the photographic power of sunlight because of their strong reflecting qualities. Gray clouds lessen this power because they absorb more than they reflect.



REFRACTION

In the case of vibrations from a stone tossed into the pool, the undulations are created in the medium itself—the water. The medium which transmits light waves is much less dense than water; it is known as the ether. It has the characteristics of an elastic fluid and

fills all space. But in that space there may be particles of dust, smoke, or moisture which refract or turn aside the light rays; and when light passes from an area of one density to an area of a different density the light itself undergoes a change through this refraction.

Experience shows us that a much shorter exposure is necessary at noon than at sunrise. Analyzing the reason for this (at noon, light travels a shorter distance through the atmosphere), the importance of a knowledge of light behavior as explained in the preceding paragraph becomes evident (Fig. 25). This explains also why the chemical action of light in high altitudes is more intense: The shorter the distance traveled through the atmosphere, the stronger its chemical action.

The sun at 50° above the horizon is 1200 times brighter than at the horizon. Likewise, the chemical action of sunlight at sunrise or sunset is very feeble and the transmission of red and yellow rays is greater. This causes the red hues of morning and evening. The altering action that atmosphere has on photoactive rays is worth considering. Refraction we have seen is present when the ray passes from a medium of one density to a medium of a different density. Thus not only is there refraction when light passes from the air into a pool of water, but a ray is bent as it passes through single particles of moisture or dust in the atmosphere. The ray, which was unimpeded energy when it left its solar source, is shoved and bounced around so much as it travels that much of its chemical energy is lost by the time it reaches the photographic film.

Likewise again, as different colors refract unequally there is a marked difference in the sensitivity of a photographic emulsion to rays that have traveled through varying densities of atmosphere. This fact can be seen when light passes through a prism. The short rays are bent more than long ones; therefore the light will spread out in a band of different colors. This band is known as the solar spectrum.

CONTROL WHEN TAKING THE PICTURE

Control, through the use of filters, can be used to increase or decrease the alterations of this light from the "normal." (Very dramatic effects can be obtained by making pictures on panchromatic film before 9 A.M. and after 5 P.M. without the use of any filter.)

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LIGHT AROUND THE WORLD

Modern trans-world travelers who tote cameras will find that their space-condensing movements introduce new problems into their photography. For instance, a Missouri photographer, enjoying a

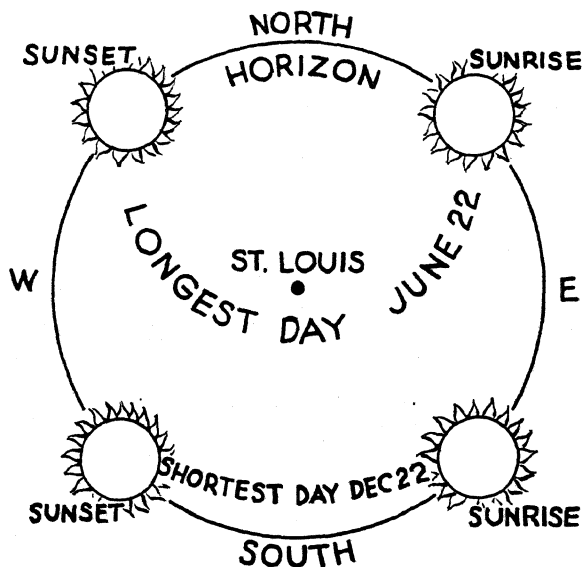


Fig. 27

The availability, intensity and quality of light varies with the seasons. A photographer in St. Louis, for example, works with an abundance of light from a sun that rises in the north and sets in the north on the longest day of the year (early summer) and with less light from a sun that rises in the south and sets in the south on the shortest day (winter).

A GUIDE TO PHOTOGRAPHIC CONTROL

flush of satisfaction because he has learned to "feel" light to the degree that his negatives are of good quality, boards a plane in St. Louis in September and anticipates picture-making at each trans-world stop. He is doomed to disappointment if he does not study and make compensation for the light changes which will confront him. Unless he uses an efficient light meter, he will probably badly overexpose his pictures in Cairo, underexpose by as much as one-half in Germany, and still further underexpose (so much that his negatives will be almost useless) in Iceland. This is assuming all exposures to be made exactly at noon on a clear day within a fortnight, and illustrates the variance in the relation of the sun and earth at different points on the globe. The relative brightness in September in Egypt would be figured at 105° ; Germany, 57° ; and Iceland, 27° .

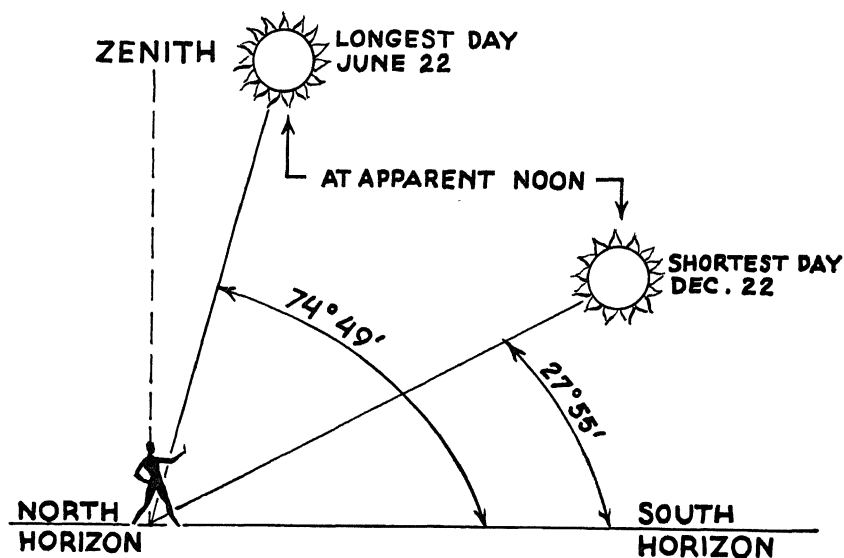


Fig. 28

Softer and flatter light would strike an object at noon in St. Louis on the shortest day of the year while a stronger and more contrasty light would fall upon the subject on the longest day of the year due to the difference of seasonal positions of the sun.

CONTROL WHEN TAKING THE PICTURE

The lower the latitude, the richer is the amount of light available to the photographer.

The availability and quality of light will determine in a large measure what kind of outdoor picture should be made in different countries. Americans are very fortunate in this respect, because this continent is blessed with good light conditions during most of the year. Crisp outdoor photography should be a natural for Americans. And while controls can be used to create the atmospheric pictures of a Misonne, for example, the photographer should remember that the Belgian pictorialist was making use of a local condition and might have produced an entirely different kind of photograph if the prevailing conditions of light had been different. Americans should make the most of good light conditions to further develop an American style of photography.



CHOICE OF FILM

The selection of film will depend upon your requirements. These are things to consider:

1. *Speed*—a factor closely allied with color sensitivity; will depend upon the film's age, the color of light with which the exposure is made, and the developer used;
2. *Latitude*—the film's capacity to yield good pictures regardless of over- or underexposure;
3. *Nonhalation films*—these have a special coating on the back to absorb the light that penetrates the film base and would otherwise cause flare by reflection;
4. *Grain size*—of special importance to users of small-size film

A GUIDE TO PHOTOGRAPHIC CONTROL

intended for enlargement, especially wherever maximum tactile rendering is desired.

The table following does not include the many special emulsions for special-purpose work, such as lithographic, continuous line, and so forth; it is a general guide for the selecting of your film:

EMULSION	USE	WESTON		ASA ¹	
		<i>Daylight</i>	<i>Tungsten</i>	<i>Daylight</i>	<i>Tungsten</i>
Orthochromatic	General outdoor, flash	24	16	32	20
Fine-grain Panchromatic	Affords big enlargements, detail, texture	24	16	32	20
Portrait Panchromatic	All portrait work, commercial use	50	32	64	40
Infrared ²	Dramatic effects, architectural, aerial				
Fast Panchromatic; Panchromatic-press	High-speed, for subjects requiring fast exposures, flash	100	64	125	80
High Speed Panchromatic	Ultra-fast, difficult light conditions, candid shots	160	100	200	125
Fast Ortho-press	Flash closeups, commercial work	100	32	125	40
Color		8	5	10	6

¹ American Standards Association.

² Speed depends upon kind of filter used.

A term almost forgotten by modern photographers is *reciprocity*. Reciprocity is the relationship of the length of exposure to the sensitivity of the emulsion. With fast films which require short exposure the time of development is lengthened. With the new ultra-speed light that lasts only 1/5000 of a second or less, it appears necessary to develop film considerably longer. It may be necessary to develop film exposed to electronic flash for twice the time usually given to develop the same film exposed to slower light.

CONTROL WHEN TAKING THE PICTURE

CAMERA POSITION AS A CONTROL

The ultimate impact of the finished photo will be greatly influenced by camera position. This does not mean that selecting the too commonly used close, low-angle position for every picture is the best means to good story-telling. Both distance and angle are of consider-



Fig. 29

Camera angle, must be considered as a control for at least partially determining the emotional concept of the picture.

A GUIDE TO PHOTOGRAPHIC CONTROL

able importance. A good photographic layout may include a long establishing shot, one or more medium shots to tell the story, a low-angle shot for dramatic interest or change of pace.

The relationship of the position of the camera to the subject parallels that of a person viewing a scene. The proximity to or distance from the subject will in a considerable measure determine emotional impact. There is a proper camera angle for every picture, and it is determined by photographic intent. Camera angle, which helps determine photographic interest, must not be confused with camera distance.

The *wide-angle picture* is sometimes used to establish the setting for other pictures which may appear in a series. These pictures usually encompass a countryside, a village, the interior of a hall or

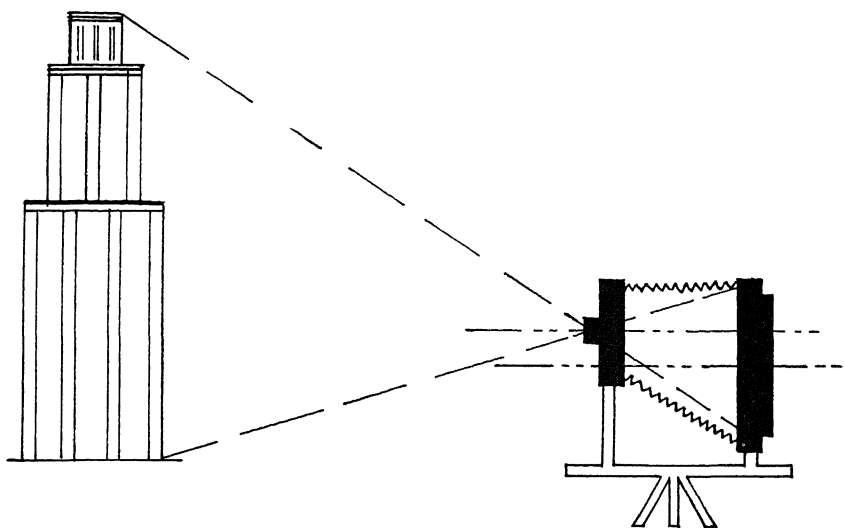


Fig. 30

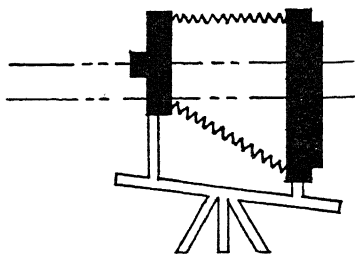
When photographing objects such as tall buildings or monuments the subject can be kept vertical in the picture by raising the lens board. This reduces the convergence of vertical lines and brings into focus both the top of the subject which is far from the camera as well as the bottom of the subject which is close to the camera.

CONTROL WHEN TAKING THE PICTURE

other spacious places. The wide-angle picture is made by moving the camera back from the principal subject far enough to show the surroundings, or by using a wide-angle lens in areas which allow only restricted working space and where distortion will not be too great. In illustrative work, particularly, such pictures must be clear and brilliant.

Fig. 31

Where extreme cases of distortion would otherwise result from photographing tall objects at close range tilt the camera bed upward and adjust both the lens board and camera back to a vertical position.



The *long shot*, generally used to achieve setting or atmosphere, is often preferable to the wide-angle-lens picture when objectionable distortion is apt to result from the latter's use. The long shot is made by moving the camera farther than normal position from the subject. When using a good lens, the drawing or perspective in a long shot is usually better than when the same scene is photographed with a wide-angle lens.

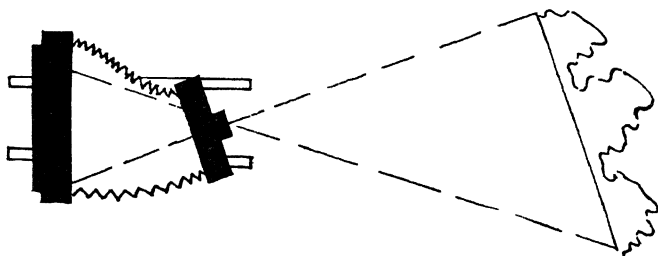


Fig. 32

When scenes have much perspective convergence they can be made to appear more parallel and be brought into sharp focus by swinging the back away from the near objects and toward the far objects as viewed on the ground glass.

A GUIDE TO PHOTOGRAPHIC CONTROL

The *closeup* is used for dramatic effect. It is made by using an extra-long-focus lens, or by moving the camera close to the subject. As the closeup brings the viewer much closer to the subject than the "normal" camera distance, the emotional effect is generally intensified because the viewer is brought almost face-to-face with details of the subject. Factualism can be very startling.

The *ultra-closeup* is the scientific or clinical approach. It gives the

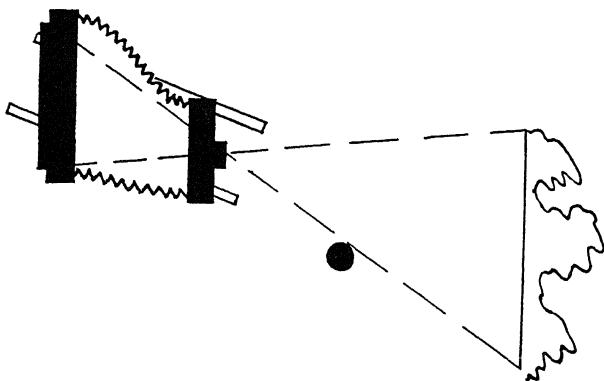


Fig. 33

When an object must be photographed from an off center position (such as might be the case when an object would obstruct a scene or building) swing both the front and back of the camera.

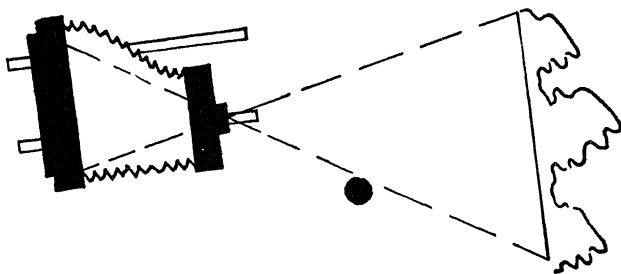


Fig. 34

The front of a camera may be shifted to correct distortion which might otherwise result if a scene or building is photographed "around" an obstruction. In extreme cases methods shown in both Fig. 33 and Fig. 34 may be used if the camera will allow this much manipulation.

CONTROL WHEN TAKING THE PICTURE

effect virtually of taking the subject apart to see what makes it tick. Auxiliary lenses, extension tubes, or magnifying devices, such as a microscope, are needed to augment the regular camera lens in order to make an ultra-closeup.

The *straight-on* or *horizontal approach* makes for a conservative, normal effect.

The *bird's-eye angle* usually presents the subject in a factual manner, as it lays the scene out before the viewer. An aerial picture is an extreme case of using the bird's-eye angle. This angle is most effective if made obliquely rather than perfectly flat. The oblique tends toward more form and perspective than the strictly vertical picture.

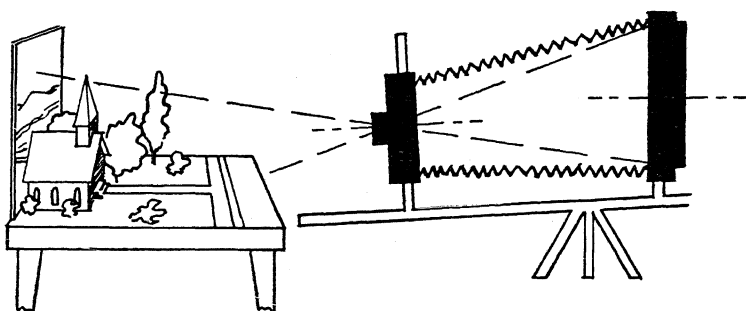


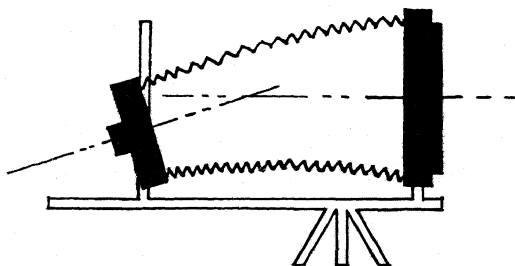
Fig. 35

In table top or display photography where objects are arranged on a flat surface tip the camera bed and/or drop the front.

A *low angle* is used to heighten the dramatic interest of many subjects, but when used too often tends to lose its impact and becomes

Fig. 36

If the lens board will permit, the front may be dropped and tilted to correct distortion in closeup table top work.



A GUIDE TO PHOTOGRAPHIC CONTROL

trite. The low angle gives a suggestion of mystery, power, domination, and elongation of the subject. Fashion pictures generally look well from a medium-low angle, as the models appear slimmer and more graceful.



CHOICE OF LENS

The photographer cannot, if he would, rearrange nature; he will therefore find it necessary to exercise such controls over his picture-taking techniques as will enable him to obtain the best of photographs under the most adverse circumstances. Lenses of other than "normal" focal length will permit the compression or expansion of the picture field and its elements.

The lens of normal focal length is one whose focal length is roughly the diagonal of the film or plate to be covered. Thus a 4x5 film will have a 5½-inch lens as a normal lens. A lens of this focal length will be adequate for most subjects (although better modeling in portraiture is possible with a lens of longer focal length).

The wide-angle (short-focal-length) lens gives a larger angle of view and reduces the size of the objects more than a normal lens (more space coverage reproduced on the same size film). It is especially helpful in limited working space.

The telephoto or long-focal-length lens makes the image larger, and allows the photographer to obtain a picture the same size as the one made with a normal lens while working farther from the subject. When the principal subject is of good proportions but the field between foreground and background needs to be decreased, use a lens of longer than normal focal length. The longer focal length will compress the field between foreground and background. In order to

CONTROL WHEN TAKING THE PICTURE

give greater prominence to objects in the background, use a lens of longer than normal focal length and move the camera position farther from the foreground. Thus the objects in the foreground will remain almost unaltered in size, but the objects in the background will appear relatively enlarged.

If the subject matter in the foreground is of good proportion, and unimportant background needs to be diminished in size, use a lens with shorter than normal focal length and put the camera position near the principal foreground object. Thus the foreground will be emphasized and the background diminished.

Not every camera permits an interchange of lens elements, so it is necessary to adopt certain camera-to-subject controls to prevent distortion and give reasonably good drawing. Tricky angles often create distortion problems, especially very low or very high angles. If disconcerting background elements need to be controlled carefully, focus on the principal subject and open the aperture to shorten the focal depth. The background will then be out of focus, or softened. Unless an unusual camera angle is desired, do not place the camera too close to the subject.

Professional view cameras and some few others are so constructed as to allow considerable manipulation of lens board in relation to the focal plane, thus giving a control over distortion. The tilting and/or swinging of the front or back elements of the camera will allow several combinations of control best explained by sketches (Figs. 30 to 36 inc.)

CHOICE OF LIGHTING

Light and shade or, as the painters call it, *chiaroscuro*, is almost inseparable from color. There is little monochrome in nature, but when a black-and-white photograph is made the photographic process reduces all color to monochrome in varying densities, and this use of light and shade becomes the basis for modeling and relief. Its careful handling enables the photographer to control by emphasis or subjection the representation of plasticity and tactile quality. Almost any subject can be rendered beautiful or interesting when viewed in the proper light. Thus light becomes a unifying element wherein the subtlest or most delicate gradations of form may be photographed.

Natural light continues to be the best source of light for the photographer; but, unlike the sundial, he may record more than the sunny hours. The modern photographer has many kinds of light at his beck and call—from the old magnesium tape, flash powder, incandescent lamp, photoflash, to the modern electronic flash. Each has its own uses, each its possibilities and limitations.

The eye picks up light rays from many angles, and the general all-over color of a scene may appear in a greater blending of colors than is apparent to the smaller, restricted area covered by a camera lens. Color contrasts appear to increase as the field is reduced—green appears greener, blue is bluer, and red is redder. When seen as a single reflected color, light becomes more brilliant.

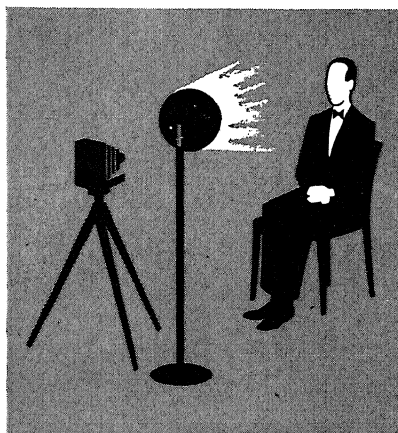
Flat lighting is useful in straight representation where the maximum amount of detail is desired, such as in clinical or record photography. This is the old box “Brownie” technique with the

CONTROL WHEN TAKING THE PICTURE

light-source-at-your-back approach. It is perhaps the easiest kind of photography, and it has commercial uses where the customer desires

Fig. 37

A single light at or near the camera produces a flat lighting effect.



to present his product realistically—without embellishment. Flat lighting in portraiture becomes useful in photographing elderly people who want the lines of their faces subdued, and children and

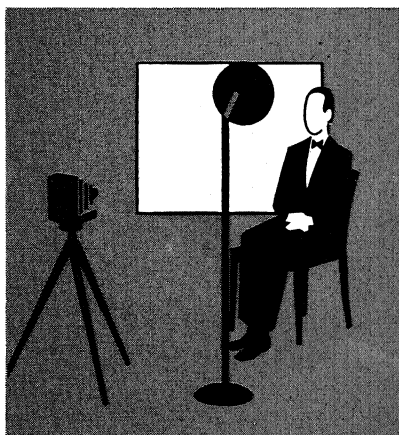


Fig. 38

Flatness in lighting when a single source is used is reduced if the light is raised higher than the subject's head and a reflector spreads some light in the shadow area.

Oriental subjects because such subjects have little nose structure. Identification or "mug" photographs are usually made by this unflattering light.

A GUIDE TO PHOTOGRAPHIC CONTROL

Dimensional lighting is best achieved through at least a 45° angle of side, top, or back illumination. If the principal source of light is from one direction only, such as sunlight or single flood or flash, an illusion of form can be created by accentuating shadow detail. This may be achieved by making a reflector of white blotting paper, huck towel, chrome drying plate, and so on, or by using supplementary lights such as a floodlight, extension photoflash, or electroflash.

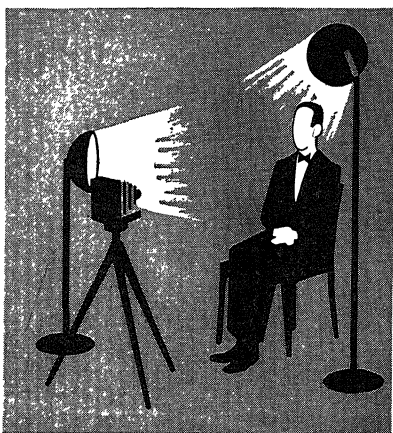


Fig. 39

Greater modeling is available if a secondary light of less intensity than the main source is used to illuminate the shadow areas.

A strong top light emphasizing the head and shoulders of a portrait subject separates the subject from his surroundings. This kind of light is also sometimes used to emphasize an individual or individuals in a group. It is available by daylight between 10 A.M. and 2 P.M., by studio boom-lights, by directed spots from the ceiling, or by an extension flash on a pole held by an assistant.

Back light helps to heighten dramatic interest in a picture. It is used to convey an air of mystery, especially if the front of the subject is in low key. The long shadows and the soft yellow quality of light prevailing from 4 P.M. to 7 P.M. are especially useful in establishing atmosphere.

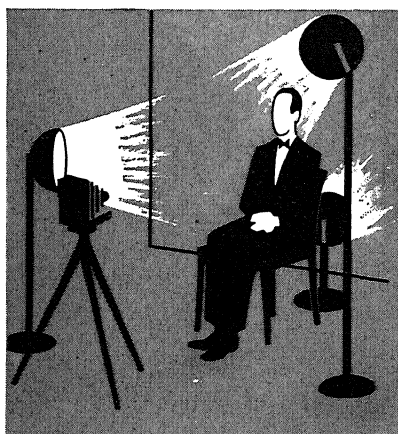
When making exposures with strong back light, an adequate shade must be used on the lens to prevent film-fogging. In some in-

CONTROL WHEN TAKING THE PICTURE

stances the principal subject or some other object in the scene may be used as a shield against the sun, but this generally makes shadows

Fig. 40

The addition of a third light to illuminate the background helps add perspective and lighter tone quality to the picture.



which trace horizontal patterns across the picture. When they cannot be avoided, a diagonal radiation of shadows is the most pleasing.

In addition to the late afternoon back-lighting possibilities, one

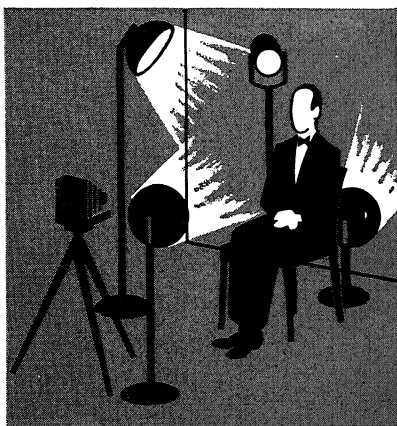


Fig. 41

A spot light may be added to provide modeling highlights. Be careful to keep rays from the spotlight from striking the camera lens.

These diagrams show basic lighting for both black and white photography.

may sometimes find early morning hours, especially in the spring and fall, good times for atmosphere pictures. Cool nights followed by warming days cause the mists to rise out of creek bottoms and from lakes and lagoons, creating lighting fantasies.

Space perception is implied on the flat planes of the photographic paper through relationship of mass, line, and tone. The outlining of the principal subject by strong side- or top-lighting helps establish definite planes within the picture area. We generally think in terms of positive space—space, that is, occupied by persons or things. However, there is also a negative space. That is the area *not* taken up by persons or things, and it must be given consideration in the final balancing of the photograph. The use of light for strong outlines helps define the positive and negative spaces. This is a much-used motion picture technique to further the illusion of perspective on the movie screen.

There is almost no occasion today for use of the old, dangerous magnesium flash powder. Magnesium tape is still sometimes used in ciné and commercial work to provide simulated campfire or fireplace effects. This tape was used by the snapshooting parents of the present generation, which currently prefers to use flashlamps instead of the more economical photofloods for everything except ciné work. Both photoflood and photoflash lamps produce a raw light, and, although useful because of convenience and quantity light output, are very harsh unless carefully handled. Careful placing of flash or flood lights in relation to the subject is necessary to prevent blocking and obvious use of artificial illumination. Glass cloth, tracing cloth, or similar light-restrainers are useful in diffusing raw light and providing soft fill-in light.

Light your subject correctly; know your light source, its strength, and its effect upon the sensitized material you are using; carefully place lights and camera so that all factors are under control. Nothing can be done to correct satisfactorily the negative of a subject burned up with too highly contrasted lighting. Only a few seconds are required to alter the distance of a light from your subject, and often a distance of six inches will prevent a photoflood or spotlight "hot

CONTROL WHEN TAKING THE PICTURE

spot" on a face. Learn to recognize these hot spots before the exposure is made.

A good rule to remember, and one that serves especially well when light less powerful than sunlight, flash, or tungsten is used, is that light intensity decreases according to the inverse of the ratio of the distance between the light source and the subject.

View the potential picture through a blue filter to help educate or attune your eyes to balanced lighting, exactly as suggested when analyzing line and mass. A blue filter shows the scale of light values very much as the negative records it. If you have no blue filter, squint your eyes down to f.22, and overlighted spots will be much more apparent. The normal anatomical construction of the face may be completely altered in a photograph by poor lighting, just as anatomical faults can be subdued or corrected by good lighting.

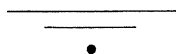
Photofloods are scarcely to be compared with spotlights as a source of illumination, and should be abandoned as soon as possible. Spotlights complete with beam control, and gobos, or "barn doors"—as the hinged flaps which may be mounted in front of the lamp lens are called—are very efficient lighting devices when properly used. They are especially good for achieving a third-dimensional effect, but unless used with much care in portraiture they will leak light on the face of the sitter.

It is easy, too, to fall into the habit of many portrait studio operators and use too many "pop" lights. This means introducing many disconcerting light elements into the picture. Likewise, indiscriminate use of spotlights, especially when they are too close to the subject, produce overexposed areas on the negative. Reduction is not too successful a procedure with portrait negatives, especially the use of abrasion methods of reduction, which destroy skin texture.

Though such lighting is undesirable for the discriminating portrait photographer, there are occasional uses in commercial photog-

raphy for very strong lighting for emphasis and dramatic interpretation—as in advertising or publication illustration. The commercial photographer must emphasize his client's product, whereas the portraitist must catch some quality of the sitter's personality. The illustrator must light for editorial emphasis. Yet indiscriminate overlighting of several points in a photograph only distracts attention, or creates none at all. The proper photogenic rendition of the subject's characteristics (or the aesthetic interpretation) must be the first consideration in setting up the picture.

In fashion photography, some of the main points of consideration are silhouette, tactile quality of the garment, stimulating effect, and special emphasis on outstanding design characteristics. Lighting aids in the successful achievement of such.



KEY LIGHTING

Some photographers acquire a reputation for “typed” light-work; that is, they make all their portraits according to a given lighting formula. This policy may enable one to achieve a certain fame—even fortune—but more versatile control is desirable since the true portraitist realizes that no one key is adequate for or does justice to all subjects.

If one begins to specialize in a lighting technique there is danger of unconsciously coming to depend more and more upon this single approach. The French have a proverb that “in the dawn all cats are gray,” but people will not enjoy being photographed according to it. There are high-key people and there are low-key people, and many more full-key types.

When the photographer sets out to make a picture he has these

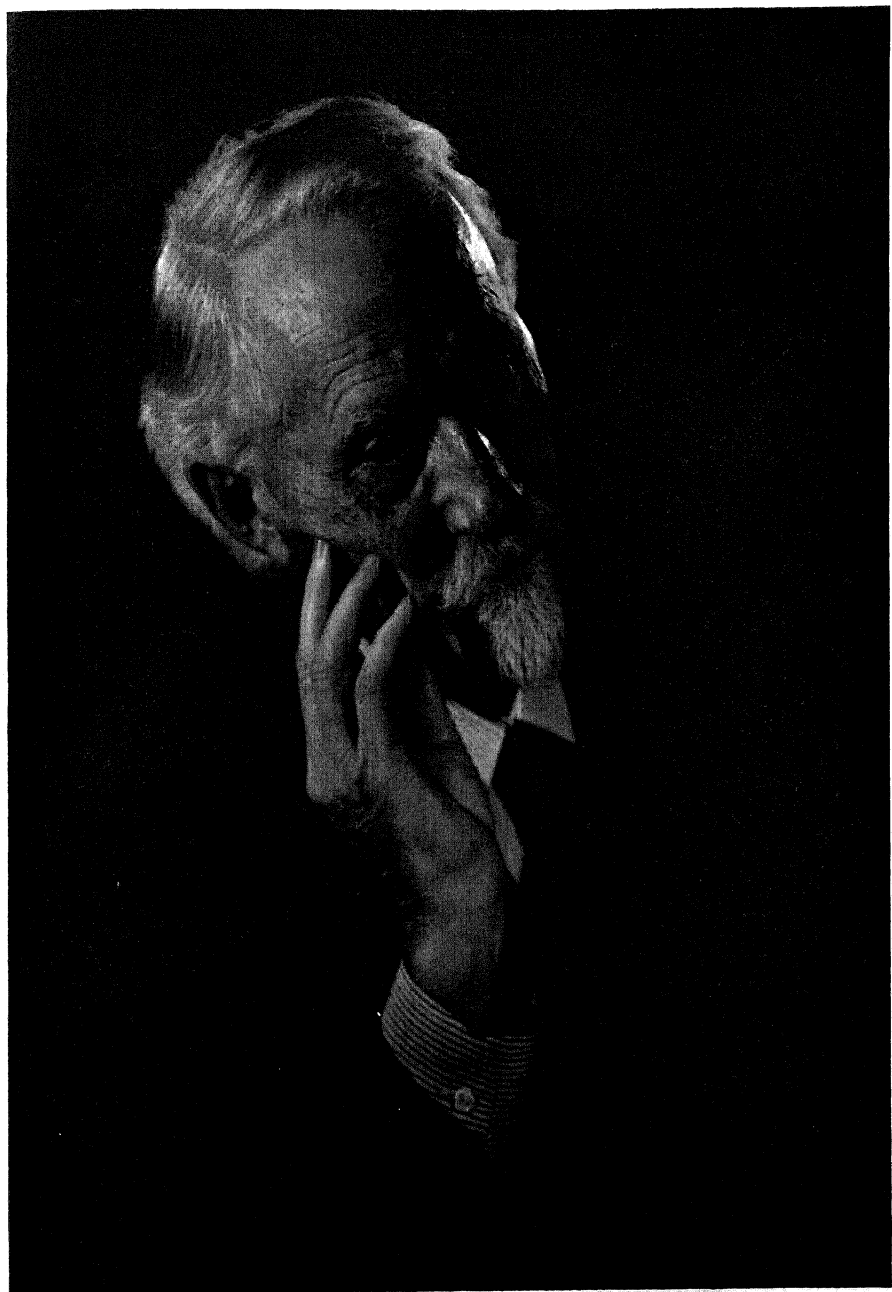


Photo by Patricia Thorne

Fig. 42

The "S" curve, commonly seen in sentimental landscapes is here used in this low key portrait.

A GUIDE TO PHOTOGRAPHIC CONTROL

three broad lighting choices—high key, low key, or halftone presentation. The subject and the aesthetic definition of the subject should determine the key in which the photograph is to be taken.

High-Key Portraiture

A high-key picture is one of overall light tonal quality giving an effect of delicacy, with crayon-effect form outline, and having a very minimum of dark accents.

A high-key portrait is one in which a maximum of metallic silver is deposited on the negative, and subsequently a minimum of silver is deposited on the print. High-key portraiture requires a high-key subject and background—those with the maximum light-reflecting qualities. This type of portraiture is not, as some suppose, shadowless. There must be shadow to render form.

The average good portrait makes use of some twenty-five to forty-five gradations of tone, ranging from white to black. In a high-key picture this scale will be very short, using only a few of the different tones of the full scale. Dark tones, therefore, become accents and they must be used sparingly. If they are allowed to predominate, the picture loses its high-key quality. Pupils of the eyes, eyebrows, a tie or flower, may add an accent. A dark suit or dark hat does not lend itself to high-key work.

A brunette should not be photographed in high key with any hope of registering the hair as it actually appears to the eye. If the normal hair tone is lightened in printing or processing, the photograph acquires an artificial quality. High-key portraiture is properly restricted to blond or light-haired subjects, or to subjects whose dark hair has been covered with a light-colored drape.

Tonal values of a normal negative may be altered to simulate high key, but this destroys skin texture. Considerably overdeveloped negatives will also produce a pseudo high key, but again, skin textures

CONTROL WHEN TAKING THE PICTURE



Fig. 43

This high key picture involves the use of rhythm as its principal means of demanding attention.

are lost, and overdevelopment builds up too great a contrast,¹ which ruins the total high-key effect.

Use a visual filter (a blue one or an old piece of blue Kodachrome)

¹ Contrast in a print is the difference between the darkest dark tone and the lightest light tone. A short scale of middle-gray tones characterizes a flat picture. A picture of brilliant whites and snappy blacks but lacking the proper fill-in middle-gray or half-tones is said to be too "contrasty."

A GUIDE TO PHOTOGRAPHIC CONTROL

to help you properly balance the light and match the delicate shadings of tone that characterize this type of work. Do not eliminate all shadows, if you want a third-dimensional portrait. The nose shadow should be seen faintly. Shadows under the eyebrows, under the lower lip, the side of the forehead, and so forth, should all be present, but should be only slightly darker than the other planes of the face.

When using a visual filter, skin tones of the face should appear only one shade darker than the background. Use a blue-white background, which, in a properly exposed picture, will lend tone, recording a shade lighter than the overall tone of the subject, but slightly darker than the lightest facial tones. If the background comes up quickly in print development, it will be too dark by the time skin textures have printed in, and the high-key effect will be lost. Avoid background shadows.

Always give full exposure in high-key portraiture, but slightly overdevelop the negative. You will learn by experience just how little to overdevelop, and it should not be necessary to underprint if the original lighting has been properly balanced.

Photofloods are acceptable for lighting the background, but use a softer light on the subject. Photofloods used exclusively as front lighting almost inevitably produce flat pictures. Avoid burning up textures with spotlights placed too close to the subject. Exposure meter-reading on the background should be the same as for the highlights of the subject's face.

Low-Key Portraiture

Low-key portraiture is the reverse of high-key, and involves producing generally dark tonal quality implying a dramatic effect, an air of mystery, of moods. A low-key picture has a very small percentage of light tones. It is produced by a minimum deposit of silver on the negative and a maximum on the resulting print. Good low-key

CONTROL WHEN TAKING THE PICTURE

portraits are made from properly illuminated, exposed, and developed negatives, and are not the result of accidental undercalculation in any of the steps of picture-making. Low-key subjects are more readily available than high-key subjects; therefore, more prints of this type will be found in exhibits. Moreover, more photographers seem to understand and favor low-key pictures. Considerable control in lighting, exposure development, and printing is necessary to retain form and textural quality in a low-key photograph. Confine low-key photography to low-key subjects.

One suggested setup for a low-key photograph is to use a single light source with little if any light spilling onto the dark background, only the salient features of the subject receiving illumination. In low-key photography special consideration is due negative space in the picture, because the form as partially revealed by the lighting must be further suggested in the dark areas. In most low-key photographs less than one-fourth of the entire picture area is illuminated. Figure 42 is an example of low-key portraiture.

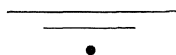
Full-Key Portraiture

One of the qualities which sets photography completely apart from all the other graphic arts is its ability to record halftones. The etcher, the painter, the draughtsman, all are limited in the number of tones at their command. The photographer can record as many as fifty different tones if he is careful with his controls. Rejoice in this good fortune and make the most of all resources.

High-key and low-key portraiture, applied to proper subject matter, can each be successfully used for definite emotional effects, but they are restrictive in lighting. Neither allows for full-color tone or tactile rendering; they are the result of limitations imposed upon photographers of the last century, who had only slow, limitedly color-sensitive film or plates with which to work.

A GUIDE TO PHOTOGRAPHIC CONTROL

The abundance of available halftones is a challenge to the photographer from the time he illuminates his subject until he lifts his print from the washwater. Full-scale rendering requires careful lighting, proper exposure on film capable of full-scale rendering, development in at least moderately fine-grain developer, and printing on paper furnishing the contrast to match the negative. Often, after a good full-scale negative is achieved, pictures suffer from poor printing or enlarging. At its best, a print is capable of rendering only a part of the tones in a negative; so good printing or enlarging is a necessary part of full-scale picture-making.



THE SHAPE OF FACES TO COME

In portraiture the general shape of the head and face of the subject should determine camera angle.

Basically, there are three types of face shapes—square, round, and triangular. The ideal face may be regarded as a well-proportioned inverted triangle, but this is a rare form indeed. If the finished photograph is expected to flatter the subject, or at least to emphasize his good points (which is usually the goal of profitable studio portraiture), these factors must receive prime consideration.

When looking at a square or round face, notice that the jawbone appears as broad as the forehead (Fig. 44). As there is a general tendency for camera lenses to broaden the subject, a full-front camera angle for a square or round face proves very unflattering. Change the camera angle by moving either the camera or the subject so that one side of the face is rotated away from the camera. Cast light (usually from a medium-high source) so as to present the face tapering downward.

CONTROL WHEN TAKING THE PICTURE

Note that in the planes of the face there is a relative separation between the tip of the nose and the cheek, a separation between the lower lip and the indentation below; that there is a distance between the spine of the nose and the eye, that the frontal bone protrudes. Observe the cheek and jawbone. Note the chin. Each plane and fea-

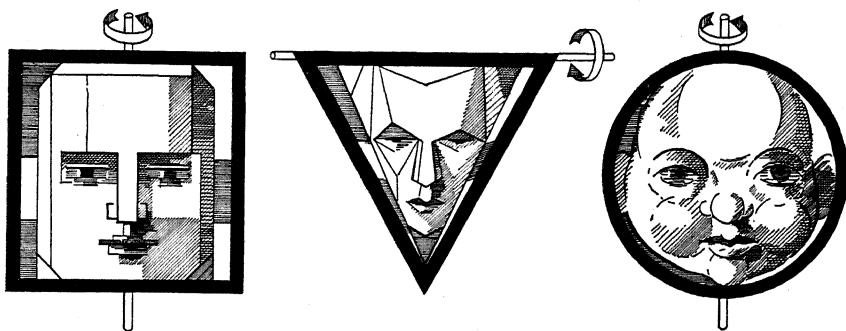


Fig. 44

Basic facial shapes are square, triangular, round or oval. In flattering portraiture these shapes may be slightly altered by rotating the planes of the square or round face on the vertical axis and the triangular face on the horizontal axis.

ture of the face must be so illuminated as to present it in its proper perspective or relationship, thus giving modeling to the face. Note the distance between the eyes—if they are set wide apart this distance can be made to appear less by turning the subject's head away from the camera on the vertical axis.

Learn to size up a subject at the first meeting. Mentally note the general shape of the head. Is the face square, round, or triangular in shape? Look at the subject's nose and note its relation to eyes, ears, and mouth. Determine good and bad features and consider the special problems of lighting and posing.

Being Nosey

You can win or lose by a nose in portraiture as easily as in horse racing. There is only one ideal type of nose, and that is the straight

one, which at best offers problems of its own. More often the subject's nose is a problem of such importance as to demand priority consideration, else it may record as a disfigurement. Sometimes it is best to accept, for the pose, that angle at which the nose appears straightest. Have the model turn his or her head on the vertical or horizontal axis, and study the nose in many positions. Poor lighting can make a straight nose appear crooked. Women are very sensitive about how a nose appears in a picture. Men seldom seem to object to a nose being realistically represented.

The flat nose is one of the most difficult types to photograph, and must be very thoughtfully illuminated. If a third-dimensional effect is desired in the portrait of a flat-nosed model, it will be necessary to use flat illumination. Electroflash is often quite effective where flat lighting is indicated, especially so in child portraiture, because it does such a good job of stopping action.

Make the broad nose less obvious by careful illumination to subdue it and prevent it from dominating the picture. Extra light on a broad nose makes it appear larger than it actually is.

Often one is called upon to photograph a nose that has flared nostrils. This type is difficult to photograph in a flattering manner. The structural flare picks up light very quickly—particularly from back-lighting. Determine the facial plane where the nose appears straightest, then be alert for light flares. Shade them down if necessary by putting makeup on the structural flare. Avoid the use of low-angle positions on a subject who has prominent nostrils, lest they appear vulgar.

The Eyes Have It!

The first emotional contact individuals have with one another is usually through the eyes. This applies also to emotional response to a portrait, for almost invariably an observer first notices the eyes

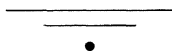
CONTROL WHEN TAKING THE PICTURE

of the subject. The contact may be only a fleeting one, but in that split-second definite emotional reactions will be set in motion. Therefore, in a good commercial portrait the emphasis is frequently on the eyes. In order for the finished portrait to reveal the character or personality of the subject through the eyes, this part of the subject's anatomy must be given considerable attention at the time of the exposure.

Most people, especially women, have interesting eyes. Merely because a woman spends more time grooming her mouth the photographic importance of her eyes is not lessened.

Eyebrows set wide apart is a photogenic fault that should be corrected in posing unless a special character study is desired.

Use eye-level, rather flat illumination for subjects whose eyes are deeply set.



CAMERA PRESENCE

Picture personality is something completely apart from an individual's naturally pleasant personality or personal beauty. Frequently very attractive persons are unable to meet the requirements for a beautiful and appealing photograph, because those difficult-to-define qualities demanded by camera and lens are lacking. Too rare is the subject who can be himself or herself before the camera. The word "photogenic" means that the individual will photograph well; and the only method of determining whether or not a person is actually photogenic is to make test pictures.

The selection of the model is of more importance to the photographer than he might at first believe. It is not enough to be impressed with a person's wit, vivacity, charm, or physical qualities, unless

these qualities can be displayed before the camera and registered accurately by the photographer. One nationally known photographer made his living photographing men only, but earned his national reputation through magazine photographs of women. Yet he would never accept appointments to photograph women, always selecting his model. The basis of a beautiful picture is often the model.

But the photographer is not always able to obtain photogenic subjects—in fact, they are rare—so he must learn to compensate for nature's errors. The first approach is to try to make the subject comfortable; to break down selfconscious, stiff, posed attitudes. No more equipment than actually is necessary should be in sight; lights need to be handled quietly and inoffensively, and while equipment and lights are being arranged the model should be engaged in conversation about something of real interest. If you have not had an opportunity to analyze the subject's face for planes and problems, it is possible to do so during such conversation, without being obvious about the scrutiny. No selfconscious person can have picture personality, so it behooves the photographer to make the subject feel at ease.

The picture personality of the subject can be brought into focus by the position of the model's body, the hands, the slant of the eyes, by a voluntary shifting of the posing chair. Recorded music, selected carefully and played softly, often helps to relieve tension and a consciousness of lights and camera.

The photographer should avoid mentioning any troublesome points to his model, and emphasize the good ones. The person who feels beautiful, or at least acceptable, has the best chance at looking beautiful. Poise registers as strongly on film as does bone structure or well-groomed hair, but, sadly enough, it is one of the least controllable elements of the portrait-making process.

CONTROL WHEN TAKING THE PICTURE

CONTROL THROUGH MAKEUP

One of the methods of controlling nature's errors is the use of makeup. By this means, blemishes can be eliminated, good points emphasized, and, if desired (as in character work), the facial structure completely altered. Miniature-camera workers especially will find makeup helpful, for by its use retouching is done on the model, thereby minimizing negative and print retouching.

A valuable psychological aid to photography is available in makeup, because it gives the model a feeling of having been idealized, and without a feeling for beauty the sitter will express too little of it. Likewise, while makeup is being applied, the photographer has an opportunity to study the planes of the model's face and predetermine photo angles. A rapport develops between model and photographer during this period that should carry over into the camera room.

Suggested steps in makeup are:

1. All existing makeup, including lip and cheek rouge, must be removed from the model's face. Place a makeup bib, towel, or an apron around the neck, and get the model comfortably seated in front of a mirror.
2. Apply foundation cream by squeezing about one-quarter of an inch onto the heel of one hand. With the fingertips of the other hand apply this foundation in tiny dabs, covering the face with dots of the cream. Use this foundation sparingly, as too much results in a pasty look. Foundation may be applied (and often more acceptably) by the model, though some supervision and instruction will be necessary.

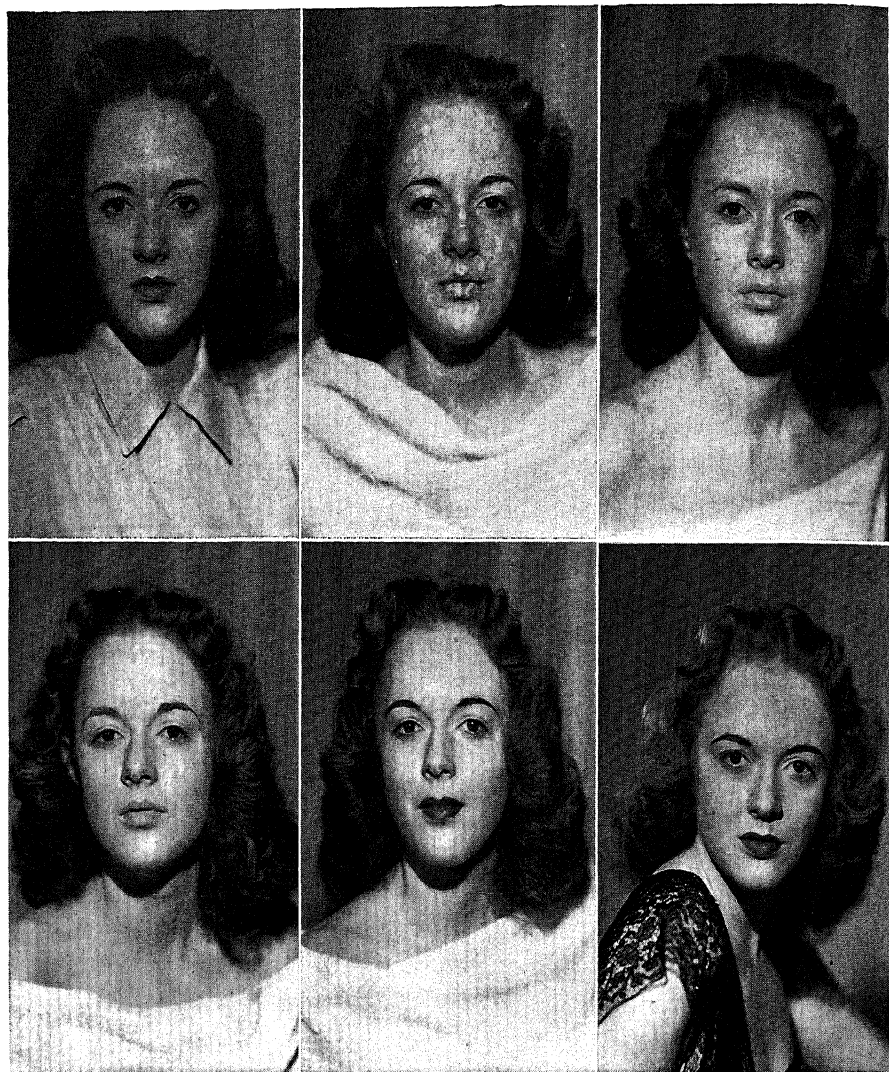


Fig. 45

Retouching on the negative can be eliminated by the use of facial makeup as described in the text.

Upper left: straight photograph of the model before application of makeup. Upper center: cream base is applied in small dabs. Upper right: base is worked smooth and eye shadow and rouge applied.

Lower left: powder applied and brushed smooth. Lower center: eye-brow, eyelash and lip makeup applied. Lower right: straight print from unretouched negative.

CONTROL WHEN TAKING THE PICTURE



Fig. 46

The final picture made by diffusing the image slightly during enlarging with a piece of crumpled cellophane held between the enlarger and the paper. About two-thirds normal exposure is given without diffusion and the remainder of the exposure made with the cellophane diffuser. Usually it is necessary to use paper one grade more contrasty than normal as diffusion tends to decrease contrast.

3. Spread the base with the fingertips so that it smoothes thinly over the face. Work from the center of the face outward, and be sure the cream works into the edge of the hair and below the

A GUIDE TO PHOTOGRAPHIC CONTROL

neckline, so that it will not give the appearance of a mask. If the fingers are dipped into cool water from time to time the smoothing of the base will be expedited. This base should cover the lips.

4. Apply eyelid shadow. Carefully line the lids with lining color. Blend this color lightly upward and outward. There should be no sharp line of color at the outer edges. Only rarely (as in cases of character markeup) should color be used on the lower lids.

5. Apply eyebrow pencil to the edge of the lower lid. This line must be very fine, drawn outward. Small eyes can be made to appear larger if this lower line is slightly extended outward from the eye. Blend this line into a delicate shadow.

6. Apply moist rouge to the lips by means of a moist, rouge brush. Be sure to give an application to the inside of the lips, so that when the subject is smiling or talking the edge of the makeup cannot be seen. Ask the model to say "prunes" or "peaches" to check lip makeup.

7. Apply powder with a clean powderpuff. Pat it onto the palm of the hand to remove excess powder from the puff, then onto the face. The powder will absorb the oily base. Cover eyelids and lips.

8. Remove surplus powder by brushing the makeup with a soft powderbrush. All surplus powder should be removed by brushing outward.

9. Make up the eyelashes by using a mascara paste or cake brush. Lashes are beaded by drawing the brush upward. A bead should hold about three lashes. The model's eyelid should be held about one-half open while this part of the makeup is applied, lest the mascara rub off on the upper eyelid. Apply a small dot of lip rouge to the inside corner of the eye with an orange stick. Eye-grooming is vitally important, as the eyes are of prime emo-

CONTROL WHEN TAKING THE PICTURE

tional appeal and usually impart more character even than the mouth. Nearly everyone has basically attractive eyes, so if the emphasis is placed on them attention is taken from less attractive features. Eyelashes and eyebrows form a kind of frame for the eyes. (In some cases of glamour photography the use of artificial lashes may be indicated: cut lashes to fit the eyelid, spread a film of adhesive such as gum spirits onto the lashes, then press the lashes onto the eyelids directly over the natural lashes.)

10. Make up the eyebrows by using the pencil. Draw short, fine lines following the natural shape of the eyebrows and bone structure. Because so many women do such a bad job of eyebrow-grooming, it may be necessary to make quite a job of the eyebrow, straightening or lengthening. A shortened eyebrow often makes the eyes appear larger.

11. Apply cheek rouge with a powderpuff. Be careful where the rouge is placed, as photographically it will give the effect of a shadow. Use sparingly in most cases.

12. Complete the makeup by carefully checking the overall effect. Be sure it is smooth. (Liquid makeup should be applied to all exposed parts of the model's body, to blend with face makeup. Start the makeup at the neck where the face makeup ends.) Dry cake, or what is commonly referred to as "pancake makeup," can be used for straight photography of youthful models with reasonably good skin texture.

13. High lustre for the hair can be achieved by applying brilliantine or hair lacquer with an artist's fixative atomizer. Shield face makeup lest some of the oily liquid spot the powder.

14. For color, regular pan makeup is useless. Only the colors recommended by experienced manufacturers are suitable. Each type needs special consideration, so check good color charts.

A GUIDE TO PHOTOGRAPHIC CONTROL

In character makeup the photographer has the same problem as a painter, in that it is necessary to arrange the patterns of light and shade to create the illusion of form. Therefore, highlights and shadows are created by bright or dull makeup. Highlights are used to emphasize nose, cheek, chin, wrinkles, and forehead. Shadows are made by using a darker shade than the base. Whenever either a highlight or shadow is used, the opposite shade should be used as a border color, and the two carefully blended.

Shape and structure of a face can be altered by using cotton, collodion, gum spirits, and makeup color:

1. Clean the face with soap and water so that there is no oil on the skin.
2. Apply gum spirits to the area to be built up.
3. Form cotton "muscle and skin" where wanted, and press it onto the moist gum spirits, which will dry quickly.
4. Apply collodion over the cotton form and let it dry. Be sure to extend the collodion beyond the edge of the cotton form, so that a continuous film is formed.
5. When the collodion is dry (it dries rapidly), carefully apply foundation cream to the face, including the built-up areas, and proceed with the makeup in the usual manner.

Figure 47 is an example of character makeup.

To remove character makeup, use a small amount of alcohol to dissolve the collodion and gum spirits. Straight makeup can be easily removed by coldcream and soap and water.



Fig. 47

Cotton and collodian were used to build up this character face before makeup and crepe hair was applied. The picture in the upper right was printed straight while the picture in lower right was enlarged with slight diffusion with cellophane held between the enlarger and the paper. The print at upper left was made by printing through the back of the paper to add the paper grain to the final print and to add some diffusion.

•

ABOUT EXPOSURE

Exposure refers to the length of time a given amount of light is allowed to enter the camera and strike the film. It is controlled by lens aperture, shutter, and filters. Exposure may be classified as slow, medium, fast, and ultra-fast.

Slow exposure, of less than $1/25$ of a second, may be used as compensation for poor light, or to permit the use of small aperture which increases depth of focus and sharpness.

Medium exposure, of $1/25$ to $1/100$ of a second, is generally indicated for portrait work and general views.

Fast exposure, of $1/100$ to $1/200$ or faster, is best for action photography, or in a situation where shallow depth of focus is necessary to control background definition, as in outdoor portraiture and fashion-work. Speeds from $1/50$ of a second also allow the camera to be hand-held. Higher speeds, from $1/100$ of a second, permit the photography of moving objects without their appearing blurred. A table of speeds on which to calculate minimum exposure follows:

1. *Speed of Subject*

- 5 m.p.h.—subject walking, foliage moving slightly in breeze;
- 10 m.p.h.—swimming, canoeing;
- 20 m.p.h.—street traffic, aquatic events, baseball, football, field hockey, track events;
- 40 m.p.h.—horse races, speedboats, ice hockey;
- 60 m.p.h.—birds in flight, trains;

CONTROL WHEN TAKING THE PICTURE

100-300 m.p.h.—gas-powered airplanes in flight,
auto races.

2. *Distance between Camera and Subject*

Distance determines the size of the image on the film, and likewise the spread of the image's movement. The closer the moving subject is to the camera, the greater the chances for error in calculating minimum shutter speed. Remember not to work too close to the subject, lest it get out of camera range before the shutter is tripped.

3. *Angle of Motion*

The table under *Speed of Subject* is for action at right-angles to the camera. The shutter speed can be reduced one-third if the subject is coming or going at 45°; two-thirds if it is coming directly toward the camera or going directly away from it.

4. *Focal Length of Lens*

This is a factor commonly overlooked by photographers who base their calculation of minimum speed on the speed of the subject only. Yet the longer the focal length of the lens the larger the image on the film, and therefore the greater the magnification of image movement.

Here is a table of round figures for computing the minimum shutter-speed to stop motion at right-angles, the subject moving at 10 m.p.h.:

*Distance from camera
to subject in feet*

	<i>Focal length in inches</i>				
	4	5	6	7	8
<i>Shutter speeds in fractions of a second</i>					
12	1/500	1/600	1/700	1/800	1/1000
25	1/250	1/300	1/350	1/400	1/500
50	1/125	1/150	1/170	1/200	1/250
100	1/70	1/80	1/90	1/100	1/125



Fig. 48

The traditional right angle or "L" form is repeated in several strong lines in this picture to create a frame for the central figure. This is also an example of new relationships of known things to heighten interest and impact.

CONTROL WHEN TAKING THE PICTURE

As an example for employing the various factors given above, consider the problem of a photographer who is attending a county fair and is shooting the finish of a trotting race diagonally across the track:

1. Horse race at 40 m.p.h.;
2. Distance of 40 ft. to the nearest horse, less $1/3$;
3. Movement at 45° ;
4. Camera has 5-in. lens.

With the distance at 50 ft. the table shows a shutter speed at $1/150$ for 10 m.p.h., therefore multiply by 4, which equals $1/600$, less $1/3$, producing a minimum speed of $1/400$ of a second.

If your object is to freeze motion, use at least 40-per-cent-faster shutter speed than for the minimum given in these tables. There are times, however, when a slight suggestion of motion rather than complete stoppage will indicate more speed. In such cases the minimum shutter speed or slightly less should be considered.

There is a greater stoppage of motion with a focal-plane shutter than with a leaf type (at a given speed), because it exposes a very small portion of the film at one time. Likewise, by holding the camera so the focal-plane shutter moves in the opposite direction of the subject, greater freezing of motion will result. Cameras with leaf-type shutters can be swung in the direction of the subject's motion to achieve a somewhat similar result.

What is correct exposure? There is actually no such thing as "correct exposure" as an invariable, because there are too many factors within a picture area to make such an exposure possible. What is usually referred to as a correct exposure is a range of admissible exposures. This range is rather largely determined by the latitude of the film--that is, the emulsion's sensitivity range.

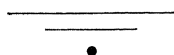
Some films, such as those used commercially and for special pur-

A GUIDE TO PHOTOGRAPHIC CONTROL

poses (slow films), have a very limited sensitivity range, while others (of the pan type) have a longer range. If the range of a film is known, it is possible, when computing exposure, to use a shutter speed and aperture setting that will enable the exposure to keep within this maximum or minimum range. This is most easily accomplished by using a dependable photocell exposure meter. The brightness-range method of calculating the exposure is indicated in this case. The brightness range of a subject is a combined meter reading. Take readings from highlight, shadow, and middle-tone areas. Add them together and average by dividing by three.

Ultra-fast speeds ranging from 1/5000 upward are used to freeze motion for novelty effect or action study. However, the commonly used electronic flash which fires at 1/5000 of a second is excellent for child and animal portraiture to catch fleeting expressions and to stop motion.

In the cases of slow, medium, and fast exposure, the shutter is the control medium—in ultra-speed photography, flash is the control.



FILTERS

Filters are devices which, when properly used, can be helpful in photographic control; but if improperly used can ruin an otherwise good picture. Although a wide variety of filters are available, many are intended for highly specialized work and are of little use to the average photographer.

Here are some facts to remember about filters:

1. Know how your film will respond to the filter you propose to use (consult the gray scale);

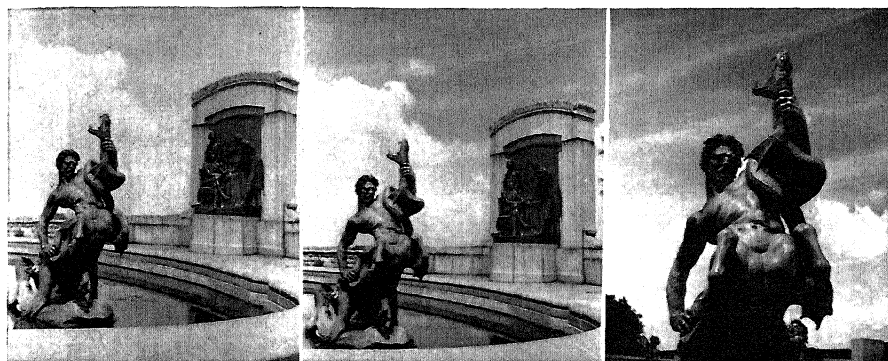


Fig. 49

The effect of filters on sky tone is shown (left) panchromatic film and no filter (middle) panchromatic film with yellow filter and (right) panchromatic film and orange filter. Dramatic interest in the picture was also increased by a closeup camera position in the picture at right.

2. Know the filter factor (number of times to increase exposure) for the film used;
3. Keep the filter clean and free from scratches (prevents poor contrast and diffusion);
4. Use filter as near lens as possible (to prevent flare and minimize distortion that might be present in the filter);
5. Use a sunshade around filter (to maintain brilliance in the negative and to prevent light flare);
6. Do not use a filter when unnecessary, or on film that is insensitive to the color transmitted by the filter.

Controls

To photograph a colored subject so that it appears light in tone in the print, use a filter which *transmits* the color of the subject. A filter transmits its own color—you would use a yellow filter to record a yellow dress in a lighter tone.

To photograph a colored subject so that it appears dark in tone,



Fig. 50

A red filter was used to create a dramatic setting for the heads of wheat which provide a sense of rhythm for the foreground.

CONTROL WHEN TAKING THE PICTURE

use a filter which *absorbs* the color of the subject. A red filter would make the yellow dress record darker on the print.

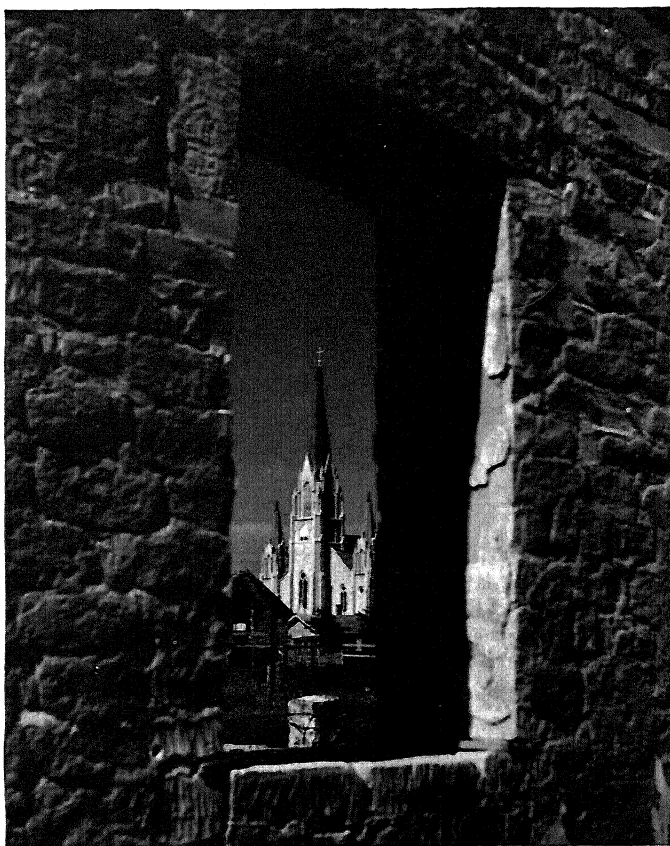


Fig. 51

A window of an abandoned stone farmhouse in the Kansas wheat country was used as a frame for the church. An orange filter increased contrast for dramatic effect. The line of the light on the right side of the window is repeated in the church spire.

A GUIDE TO PHOTOGRAPHIC CONTROL

Varieties of Filter

Types of filter available vary constructionally and include:

1. Gelatin sheets, which are cut to fit between the air cells of the lens (they must be handled carefully to prevent finger-marks);
2. Gelatin sheets bound between optically flat glass plates, which are placed in front of the lens;
3. Glass plates of dyed optical glass, which are placed in front of the lens;
4. Polarizing filters, which are transparent plastic sheets on which a series of parallel lines have been made. The light-polarizing screen is placed in front of the lens and rotated to eliminate glare from water, and to remove certain reflections from glass, and to heighten cloud-to-sky contrast. (A single element is effective for correction only on light that strikes the subject at a 45° angle.)

In some situations, the light source itself, such as floods or spots, can be filtered by special gelatin sheets hung in front of the lamp. Light from flashlamps may be filtered by cellophane bags or glass cloth placed over the bulbs, or by dipping the bulbs into dye solutions.

Commonly Used Filters

There are two classifications of filters: compensating filters; and those used to increase contrast.

Compensating filters are used to aid a film of limited color sensitivity to equalize the color rendering with that of the eye. An example is the yellow filter used with orthochromatic film to bring the contrast of the photograph more nearly into tonal balance with the contrast of the subject. A light-green filter is used with the high-

CONTROL WHEN TAKING THE PICTURE

speed pan films; and special compensating filters, called "U-V filters," are used with outdoor color film to cut aerial haze and ultraviolet light.

The various types of compensating filter include:

1. *Very light-yellow*—gives some color correction, reduces haze somewhat, accents clouds and foliage;
2. *Medium-yellow*—same as the very light-yellow but with more color correction;
3. *Light-green*—for correct color rendering in daylight when used with fast pan film; brightens green;
4. *Deep-green*—similar to the light-green but used with artificial light.

Contrast filters are used to minimize the range of tone as the eye sees it. By the use of contrast filters any color may be emphasized, subdued, or eliminated. They are frequently used in copying blue-prints, photostats, artists' sketches, commercial copywork. In some instances such filters are used for special dramatic effects in outdoor pictures. The varieties include:

1. "*G*" (*deep-yellow*)—increases contrast in yellow subjects and reduces aerial haze;
2. *Orange*—slightly increases contrast in outdoor subjects without much increase in exposure; good for pictorial effects;
3. "*A*" (*light-red*)—for strong pictorial effects, including moonlight or emphasis on white clouds when used with panchromatic film; eliminates blue and violet; may also be used with infrared films; usually requires considerable increase in exposure;
4. "*F*" (*deep-red*)—used with infrared film at greatly increased exposures; used to photograph blueprints; reproduces red as white;



Fig. 52

A yellow filter was used to increase the contrast in the sky and the corn stalks photographed in late fall light. Notice how the diagonal lines of foreground, middle distance and the clouds converge on the farm wagon.

CONTROL WHEN TAKING THE PICTURE

5. "*B*" (*green*)—for making green (as summer foliage) appear lighter, and red darker;
6. "*C-5*" (*blue*)—renders blue as white; renders green, yellow, and red darker than normal;
7. *Minus blue*—haze elimination;
8. *Aero No. 1.* (*light-yellow*)—slight haze elimination in aerial photography;
9. *Aero No. 2* (*medium-yellow*)—maximum haze elimination.



Fig. 53

The stark realism of this country churchyard is dramatized in the repeated forms in the gravestones, the blackness of the gaunt trees and the light and dark (life and death) sky. A red filter and panchromatic film and camera angle were the principal controls used.

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THE EXPOSURE METER

The exposure meter can be classified as either a gadget or a useful tool, depending upon how it is used. Unless a photographer is quite familiar with how his meter works, it is best that he leave it in its case and rely upon the instruction sheet which comes packed with the film. Used intelligently, a good meter can be a very valuable aid to good photography—almost a necessity to good color photography.

Selection of the meter is important. Be sure it is one that was designed for photographic use, not one adapted from a lighting engineer's tool. Its light-sensitivity range should be long, extending from very low to extremely high light. Likewise, the calibrations should be marked in modern film speeds, extending even above the range of currently available film. It should be purchased from a company which has a liberal service policy that includes low-cost repairs and replacements.

The exposure meter is an energy meter; it may operate upon the principle of measurement of the light reflected by a subject or falling upon the subject, depending upon the kind of meter used. There is one meter which measures the incident light which strikes the subject.

The planned use of a photograph will determine how the negative is to be exposed—the meter will be used to determine how to achieve this end. It of itself cannot do the thinking, so it is scarcely sufficient to aim the meter at the subject, wave it in an arc, and take a reading from the dial. Instead, it will be necessary to analyze the scene, determine what elements interest you most, and carefully calculate a “normal” reading by aid of the meter. Then, knowing this normal, it will be possible to expose for a predetermined effect.

CONTROL WHEN TAKING THE PICTURE

When there is a principal subject which interests you, the reading should be made with the meter held about 2 feet from the subject. Take readings from highlight, middle-tone, and shadow areas. Jot down the readings and compare this range from high to low with the film range. (Consult the sensitivity range table.) Average the three readings, thus compressing the range to arrive at a reasonable normal. This basic reading can be adjusted to compensate for emphasis of certain subject matter, or to create special emotional effect.

The careful use of an exposure meter is very helpful in work with color film because of the color film's restricted latitude. Again you must determine the most important element in the picture and strive for the nearest normal exposure. Keep in mind that color film is a reversal film; underexposure will result in a dense transparency, and overexposure will produce a thin one. The brightness range on a color subject should not be greater than 1 to 4. (For example, a low of 25 and a high of 100 would be the greatest permissible variance.)

Meter readings can be taken in very poor light by measuring the light reflected from a white card at 1 foot distance, then dividing the reading by four. Thus, if the reading on the card was .8, the dial setting would be .2.

Data on meter readings should be kept from time to time and compared with the resulting negative density. This is particularly important when first using the meter, because it may be necessary to adjust the exposure factors to compensate for fast or slow shutters. Many shutters do not operate at the exact speeds indicated, because of variable spring tensions (often due to the fact that the owner of the camera has left it with the shutter cocked and thereby reduced tension). Focal-plane shutters are frequently off time because of similar carelessness. This variation of actual speeds is why every photographer must work out his own exposure compensations, and not rely en-

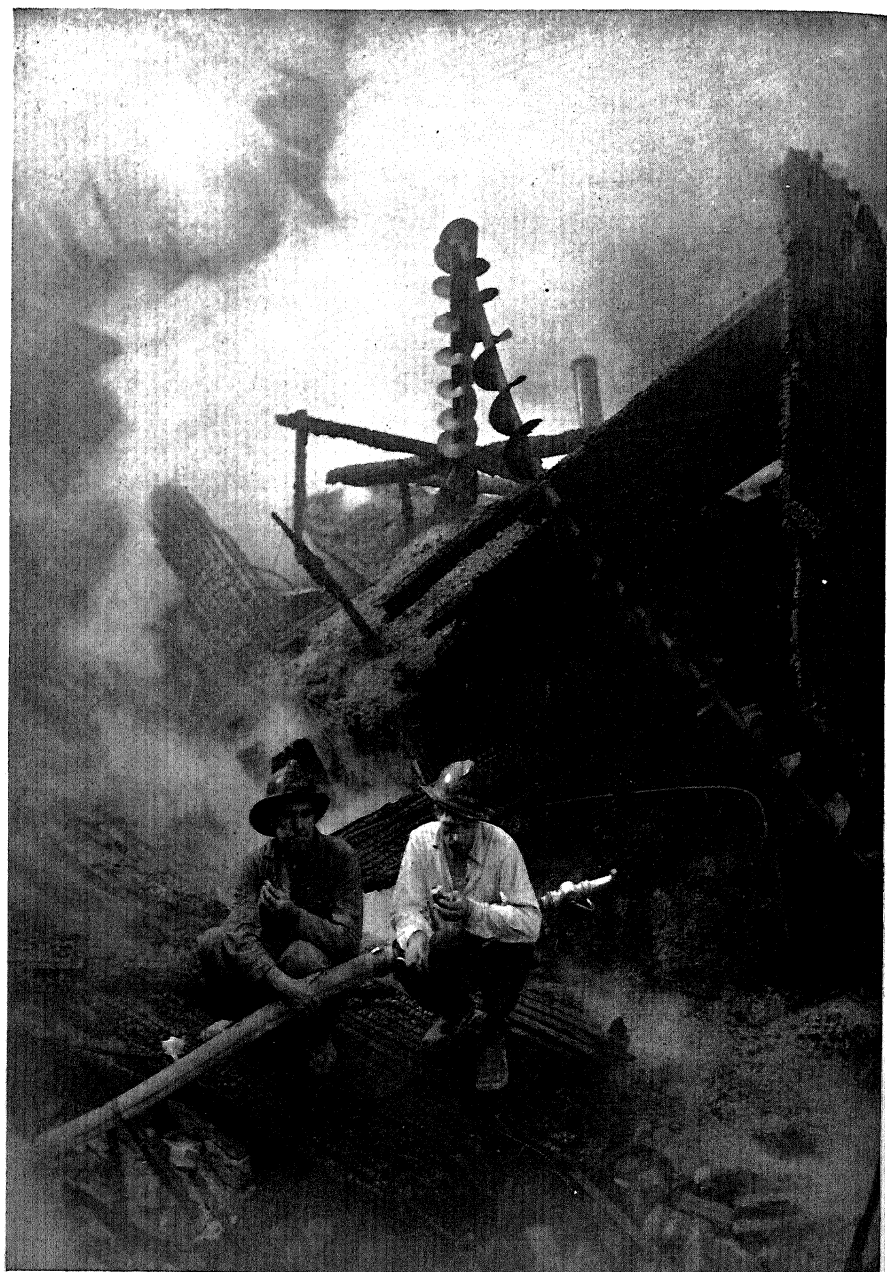


Photo by Virginia Smith

Fig. 54

This news-feature picture of two firemen munching hamburgers while resting from unsuccessful fire fighting has a fantastic quality resulting from the smoke and the stark outline of a broken grain conveyor.

CONTROL WHEN TAKING THE PICTURE

tirely upon meter readings that may work satisfactorily for another photographer's camera.

The developer to be used in processing the film should be considered when the exposure is calculated from the meter reading. Some developers (particularly fine-grain developers) are of low energy and require longer exposure than do high-energy developers. Test film and developer to determine what compensations need be made.

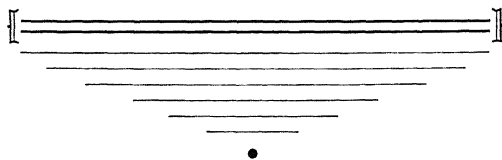


HYPERSENSITIZERS

It is sometimes desirable to increase the emulsion speed of film for candid-camera work in poorly illuminated places. This is a simple process which is especially easy with 35-mm. film or roll or cut film where a tank is available. Simply load the film into a tank (as usual, in complete dark) in which 10 grains of metallic mercury have been placed, replace the tank lid and let set 36 hours. Rolled film also can be hypersensitized, but must be exposed to effusions of the mercury in a tight box for about a week (same amount of mercury dropped into bottom of box as above).

A latent image known to be underexposed, as in the case of stage, night, or candid interior pictures, can be hypersensitized before development. The same method of placing the film in the developing reel or tank slots for 36 hours is recommended for hypersensitizing the latent image.

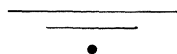
Development of hypersensitized film is carried on in the normal manner.



CONTROL WHEN PROCESSING THE NEGATIVE

“IF IT isn’t in the negative you can’t get it in a print.” That’s more truth than poetry. Occasionally a pictorialist does make a salon silk purse out of a sow’s ear negative, but the negative is the matrix from which all prints have their beginning, and notwithstanding volumes that have been written on the subject, thousands of great pictures are lost annually because of poor negative-processing. And most of these losses are due to one major cause—carelessness.

Attention to the details of film-handling, limited use of safelights, carefully compounded formulæ, proper time and temperature limits, adequate fixation, sufficient washing, careful swabbing and drying, are absolutely essential to good negative production. Negative-processing best demonstrates the fact that there are no shortcuts to good photography. Controls in negative-processing are not shortcuts but are cautions—observe them.



CONTROL TO ACHIEVE QUALITY

The terms which describe the quality of the negative are *scale*, *contrast*, *density*, *flatness*, *brilliance*, *softness*, and *sharpness*. They are explained here, with their controls.

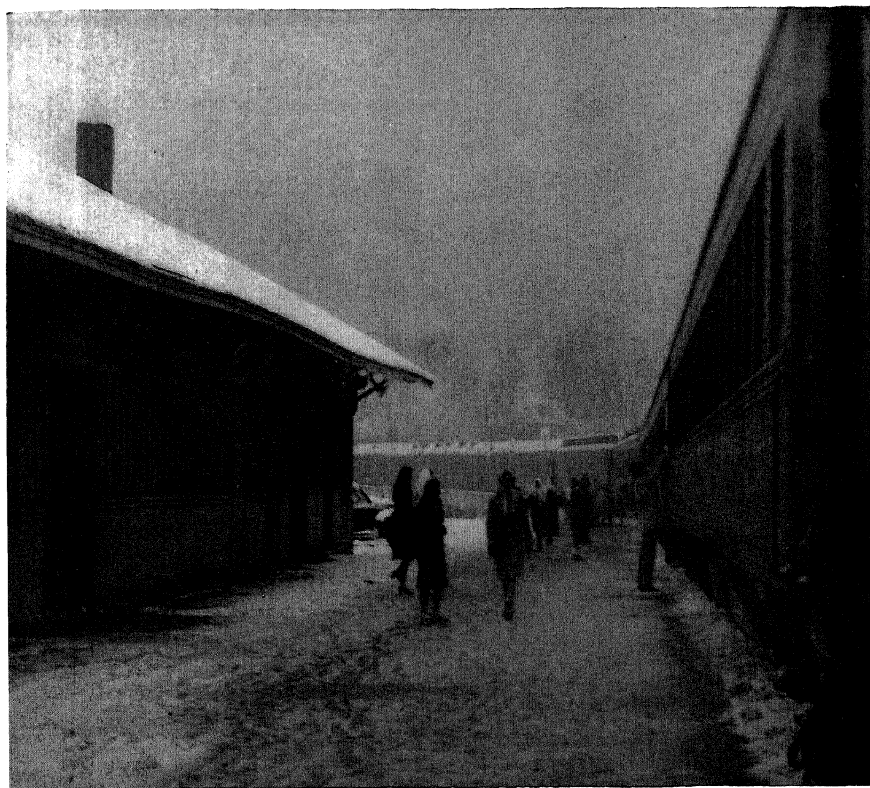


Photo by Sally Schilling

Fig. 55

The "L" form of the waiting train is accentuated by the thrust of the dark diagonal mass of the station. This picture was made with a box camera.

A GUIDE TO PHOTOGRAPHIC CONTROL

Scale

Scale is the relative difference between the densest (highlight in print) and the thinnest (shadow in print) portions of the negative.

When shadows are transparent and the highlights very dense, you have a long-scale negative.

Shadows are transparent and highlights are of average density in a normal negative.

Control: To achieve proper scale, subject matter should be so selected and illuminated that the scale of the negative, when developed to the desired contrast, yields a print that includes good whites and blacks with adequate middle tones to express the original concept of the picture.

Contrast

Contrast is the relationship between the tonal scale of the negative and the tonal scale of the subject.

A short-tonal-scale negative reproducing a long-tonal-scale subject is said to lack contrast, to be "flat" or "soft."

A negative which has the same tonal scale as the subject is normal.

A negative which has a longer tonal scale than the subject is termed "contrasty" or "hard."

Control: Degree of development governs contrast and should be adjusted to the subject matter rather than to the scale of the subject. Portraits require a soft treatment. Full scale is obtained by control of the lighting at the time of exposure. The type of film material and the degree of development controls the contrast or local tone relationship. Commercial and industrial pictures require brilliance, which may be obtained by slightly prolonged development.

The lighting of the subject should not yield excessively long scale, otherwise the extra contrast of development will result in a negative of too great a scale for good reproduction on paper.

CONTROL WHEN PROCESSING THE NEGATIVE

A portrait correctly developed but illuminated with too great a scale (too much contrast) may be unsatisfactory even if printed on a soft paper. Soft paper will correct for scale but will excessively soften contrast. Likewise, a correctly developed negative illuminated for too little scale is not improved much by printing on a contrasty paper. Again, the scale is corrected but the contrast is too brilliant and appears chalky.

Density

Density refers to the overall appearance of the negative, describing the quality as dark, heavy, dense, or light, transparent, thin.

A negative is considered dense if both shadows and highlights are extremely opaque.

Control: The exposure of the negative determines its density. Underexposure is apparent in the thin shadow areas which lack detail. Correct exposure results in a negative of moderate average density having shadow areas full of detail. Overexposure results in dense, heavy shadow areas. Overexposure of a long-scaled subject results in heavily blocked-up highlights.

Flatness

Flatness refers to the lack of scale in a negative. A very short-scale subject reproduced with normal lighting and development contrast will result in a flat negative. A normal or long-scale subject reproduced with too little contrast produces a flat negative.

Control: Correct illumination eliminates flatness. Clean working conditions, correct compounding of solutions, and safe darkroom illumination prevent flatness due to fog.

Brilliance

Brilliance in a negative is the result of a subject's being reproduced with correct lighting, exposure, and development, which give to the

A GUIDE TO PHOTOGRAPHIC CONTROL

negative and print a clean, snappy appearance. A brilliant negative is free from fog, is not dense, and has good contrast. It is in sharp focus.

Control: To insure brilliance in a negative, shorten the subject scale (illumination) above 15 per cent and increase development time proportionately. This results in a negative of slightly greater-than-normal contrast but of correct scale for printing.

Brilliance is also achieved by illumination providing reflections and highlights. Glossy subjects should not give highlights by reflecting the lights themselves, but by the reflection from a white card or cloth.

Softness

Softness is the quality a negative possesses when the subject is reproduced with slightly less-than-normal contrast; this imparts a delicate softness to the negative and print. It is not necessarily short in scale, for best results are obtained when small areas of sparkling highlights and deep shadows are present.

Control: A soft negative has subdued brilliancy, and is slightly less contrasty than normal. It is clean and free from fog, and is sharply focused. Where softness is desired it is usually advantageous to increase slightly the scale of the illumination in order to obtain a full-scale print. Development may be reduced from 10 to 15 per cent to achieve softness.

Sharpness

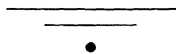
A sharp negative is one that is carefully focused and taken with a lens opening sufficiently small to assure correct focus in all essential elements of the picture.

It is always desirable to obtain sharp, clean negatives, and if diffusion of the image is desired a diffusing medium should be used dur-

CONTROL WHEN PROCESSING THE NEGATIVE

ing enlargement. Diffusion obtained by lack of correct focus does not give as pleasant an effect as that achieved during enlargement.

Control: The portions of a picture which appear sharp are divided so that at least one-third of the depth of focus is in front of and two-thirds behind the principal focal point. Therefore divide into three parts the distance from the nearest point to the farthest point you wish rendered sharp. Focus on that point which is one-third the distance behind the nearest point, and stop down until the nearest and farthest objects are sharp. In portraiture, focus on an eye or eyebrow.



DESENSITIZERS

Most of the films commonly used today, except orthochromatic films for special commercial use, are highly sensitive to all color. Hence they cannot be inspected during development under either red or ordinary green safelights, unless the emulsion is first desensitized. Pan films may be bathed in a special dye solution (in total darkness), and thus desensitized so that they may be developed and inspected under a red safelight such as the Ansco No. 107 or Wratten Series 1. The dyes commonly used are pinakryptol green and pinakryptol yellow. Pinakryptol green, obtainable in either dry powder or in concentrated liquid form, will work well with all emulsions. It may be used as a preliminary 2-minute bath or mixed directly with some developers.

The stock solution of pinakryptol green consists of 15 grains of the dry powder mixed with 16 ounces of water. (A 50-50 water-alcohol solution may be used instead of water, to increase the keeping qualities.) For use, dilute 1 part stock with 10 parts water. The film is

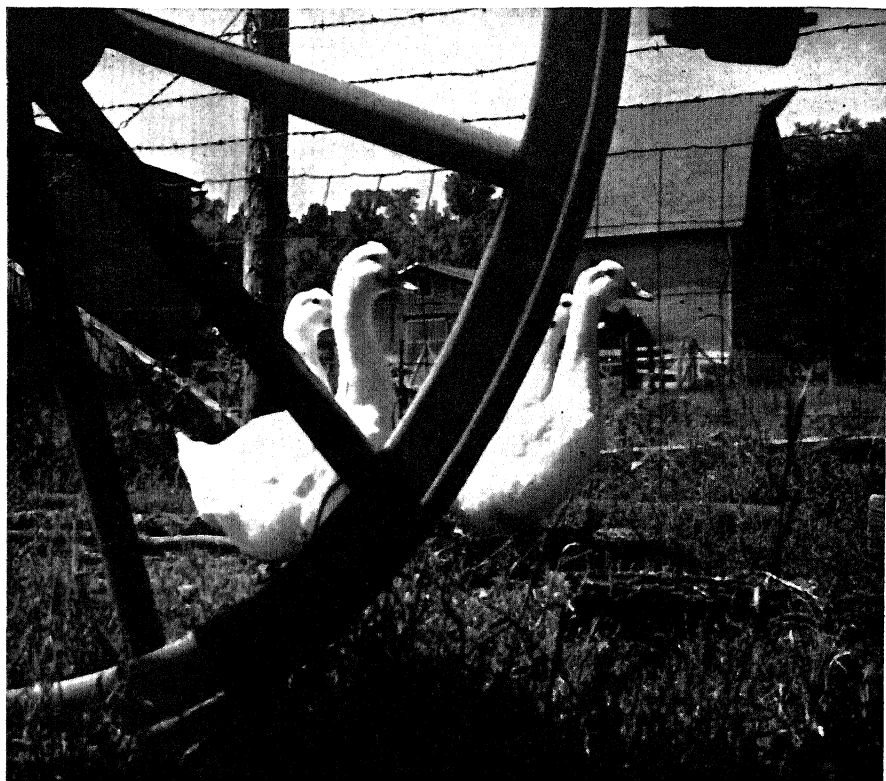


Fig. 56

PARADE was made with a wide angle lens on a 35mm camera. A yellow filter added contrast to the panchromatic film. This is an obvious use of the radii and the circle (unfinished in the picture) as a composition device.

immersed in 65° desensitizer¹ (in total darkness) for 2 minutes, then rinsed well in cool running water before being placed in the developer.

For use with developers to which the desensitizer can successfully be added, mix 1 part of the stock solution in 30 parts of developer. Development should start in total darkness, but after the film has

¹ Unless otherwise noted, all temperatures given in this book are Fahrenheit.

CONTROL WHEN PROCESSING THE NEGATIVE

been in the desensitized developer for at least 2 minutes it can then be observed under the red safelight.

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FILM DEVELOPMENT

Control of film development is essential to good negative-making, and attention to the detail of recommended procedures cannot be too strongly emphasized. Once the mechanics of procedure suggested by film manufacturers are well understood, you can learn to use special controls such as overexposure, underdevelopment, underexposure, overdevelopment, forced development, and so forth, but it is well to experiment conservatively and slowly to avoid loss of valuable pictures.

The chemical developing processes reduce silver halides to silver by removing chlorine, bromine, and iodine, affecting only the grains exposed to light. Developing agents (hydroquinone, metol, pyrogallol) are weak in action, but when an alkali is added it reacts with the developer to form a strong salt. This salt is the true developer. A preservative is added to the developing solution to prevent stains and oxidation. A restrainer is also desirable in order to hold back development of unexposed grains of silver halide which would otherwise cause fogging. Bromide is a restrainer, and soluble bromide is a product of development, but is not present in adequate amounts. Therefore bromide is added to the developer in given amounts.

Physical developers operate on the principle that they add metallic silver during development to those parts of the film exposed to the light. When physical developers are used, the film must be constantly agitated if a normal deposit of silver is to be formed. Mechanical agitation is seldom satisfactory, and in some cases may cause

streaking by uneven deposition of silver. It is better to hold the tank in the hands during the entire development time.

Errors in exposures can be only partially corrected during development. Lack of exposure in the shadow areas means no image on the film to be developed. In an overexposed negative, both highlight and shadow areas will be too dense, therefore overexposure can be only partially compensated for by underdevelopment (since relative density will be too low).

There are many different kinds of developers, and many of them good, but a few rules to bear in mind are:

1. Select one good developer evolved for the type of film emulsion used, and become familiar with its possibilities and limitations;
2. Learn how to make required compromises with your exposure factors;
3. Having learned how to use a good developer, stick with it for all important work.

This does not mean that you should never try new materials. Do be careful of too-rapid changes leading only to photographic frustrations. There is probably more confusion among photographers on this point than any other, and there are few who will admit this to be a principal problem in good picture-making.

With the wealth of good developers currently available there is still opportunity for improvement and simplification. This will undoubtedly come after further research, which may make even "dry" development possible. Meanwhile it behooves the photographer to assimilate the known formulæ and select the one method best suited to his own needs.



Fig. 57

POWER OF THE HILLS contains a repetition of the circle as a composition form.

FILM DEVELOPERS

Film developers especially recommended by manufacturers are given on formula sheets packed with the film. The most commonly used packaged developers and those most easily mixed include: Ansco 47 (all film purpose); Ansco 17 (fine grain); Eastman 60-A (fast for 4x5 or larger film); Eastman 76 (moderate fine grain); Eastman Microdol (fine grain); Defender 777 (fine grain); and Edwal 12 (fine grain). Because the formulæ for these commonly used developers, as well as the prepared mixtures, are so easily obtained they are omitted here. However, there are two excellent film developers which must be mixed by the photographer:

1. *Keeping Pyro*. Developers containing pyro have long been favorites with photographers desiring fine grain, and tactile rendering in portrait and commercial work. However, pyro oxidizes rapidly in most formulæ and stains badly. Therefore it has been necessary to use an A, B, or C type developer with pyro, mixing the working solution just before use or discarding a "stock" working solution within a few days. Andrew Tau, an ardent experimenter, developed a "keeping pyro" which retains the development characteristics of most other pyro developers, but has the added advantage of good life. This developer has been used over a period of several weeks with good success. The formula is:

Metol—5 grams
Sulphite—80 grams
Pyro—10 grams
Paraphenadiazine—10 grams.

CONTROL WHEN PROCESSING THE NEGATIVE

Water——1 quart

Develop pan film 10 minutes.

Replenish with same formula at rate of 1 oz. for each 35 sq. in. of film surface.

2. *Special Portrait Developer*. The formula here is:

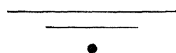
Sodium Sulphite——18.7 grams

Glycin——7.5 grams

Sodium Carbonate——37.4 grams

Cold water to make——1000 cc.

For *development by inspection*, develop 6 minutes in total darkness. Turn the panchromatic (green) safelight on only long enough to permit close inspection. Next, return the film immediately to the developer, repeating inspection as necessary. Finally, use an acetic acid “short stop” between development and fixation.



TEMPERATURE

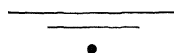
Most developers are compounded to work best at from 65° to 70°, although they may be used at higher temperatures if special salts are added to prevent emulsion problems. It is known that a rise of 18° will double the chemical action of a developer. However, there is danger of such increase causing chemical fog. Temperature rises increase density, and, to a degree, the contrast of the negative (though maximum contrast depends chiefly upon the type of emulsion in relation to illumination, exposure, and length of development).

Many photographers who are otherwise exacting about their work are careless about the temperature of developers. They assume developer temperature to be equal to room temperature, or use a finger

as a thermometer, or may not bestow even that doubtful consideration. Consistency of negative quality is not possible of attainment with temperature inaccuracy.

Because a developer in a bottle is at a certain temperature it will not necessarily remain there after it has been poured into a tank and kept for 10 to 25 minutes. The temperature of a developer may drop or rise as much as 5° from the time it is tested in the stock bottle until after it is poured into the developing tank. Such changes will retard or accelerate development appreciably. This variance is most likely when metal tanks are used.

A good procedure is to test the temperature in the stock bottle and make certain that the developer is at the desired working point. If it is necessary to raise or lower the temperature by heating or cooling the developer, be sure to stir or shake before testing. This precludes varying thermal layers. Feel the tank. If it feels cool (as a stainless steel tank may), warm it with your hands or with warm water before pouring the developer into it. Naturally, the first thing one should do after film meets developer is to agitate the tank, but as soon as possible the developer should be temperature-tested. Total development time is then adjusted to compensate for any temperature change.



AGITATION

Stay as close to the developing tank as an expectant father to the delivery room—agitate the tank frequently. The first few minutes of development are the most important, but every minute of the total time has its own importance. Agitation, when the dry film begins to absorb the developer, makes for even development and prevents gas

CONTROL WHEN PROCESSING THE NEGATIVE

bells from gathering on the surface of the film. Gas or air bells cause undeveloped areas which become clear holes (pinholes) when the film is fixed in hypo.

The final printing quality of the negative so far as development is concerned may be determined by agitation. Contrast is greatly in-



Fig. 58

OZARK HEAVEN uses the pyramid composition as its basis but note how the movement of the hounds create a circular movement at the base of the picture.

A GUIDE TO PHOTOGRAPHIC CONTROL

creased by agitation, which actually causes a movement of exhausted developer from the film surface and permits fresh developer to reach the emulsion. A good rule to follow is to agitate films almost continuously for the first 3 minutes of development, and for a few seconds every minute thereafter.

NEUTRALIZING

During the period of development, the developing solution penetrates the emulsion. Therefore the developing action will continue in some degree even after the film is placed in the hypo, unless the developer is neutralized. As the accelerator of the developer is an alkali, it can be quickly neutralized by an acid. When a negative (or print) is developed to the peak of quality, it should be immersed in a mildly acid bath before immersion in the fixing solution. The use of a chrome alum bath is recommended for film, particularly if the temperature of the developer should go above 70°. Since chrome alum, a hardener, is only slightly acid, acidity is increased by the addition of a small amount of 28% acetic acid. The chrome alum stop-bath formula is as follows:

Chrome Alum——1 oz.

Water——32 oz.

28% Acetic Acid—— $\frac{1}{2}$ oz.

Place the film in this bath and agitate for 3 to 4 minutes; rinse before placing in hypo.

This chrome alum solution is short-lived, so mix a fresh batch daily; mix fresh for every 4 rolls of film.

FIXING

The function of the fixing bath is to remove from the surface of the sensitized material the remaining silver salts which are not reduced to metallic silver by development. The antihalation backing of pan film also is removed in this bath.

Hypo (or Epsom salts for that matter) will remove the silver salts, but that is not sufficient to the permanent "fixing" of the negative. Sulphite is added as a preservative, potassium (white) alum for hardening, and acetic acid as a final check on further development.

Films should not remain in hypo more than a minimum time (about 7 minutes for fresh hypo), as a longer fix prolongs washing time. The life of the hypo depends upon the number of square inches of emulsion surface placed in the bath. This is roughly 80 sq. in. of film for 1 oz. of hypo. (A good rule is to let films remain in the fixing bath for twice the length of time required to clear them.)

An exhausted fixing bath will shorten the life of negatives (or prints), causing stains, blisters, frills, and leaving a deposit of silver that can never be washed from the emulsion.

A satisfactory negative-print fixing bath is:

Water (about 125°)—80 oz.

Sodium Thiosulfate (hypo)—2 lbs.

Sodium Sulfite, desiccated—2 oz.

Acetic Acid, 28%—6 fl. oz.

Kodalk—2 oz.

Potassium Alum—2 oz.

A GUIDE TO PHOTOGRAPHIC CONTROL

Cold water to make——1 gal.

Dissolve the chemicals in the order given.

This formula will fix approximately one hundred 8x10 prints or films, or an equivalent number of square inches of emulsion.

When negatives have been fixed they are given a good rinse, and then may be printed wet if rush work should make it necessary (as in meeting a newspaper deadline). In the case of wet-negative contact-printing, wet the printing paper, lay the wet negative—emulsion side in contact with the emulsion of the paper—then make the exposure.

To enlarge a wet negative, use a glassless negative-carrier, such as a metal frame, with an opening slightly smaller than the outside dimension of the film. Carefully wipe the surplus water from the film before placing it in the carrier. If the wet negative must remain in the enlarger very long, make a frequent heat check. Excess heat may melt the emulsion. Also check for accumulated water droplets, which run together if the negative sags; they will cause a white ring in the enlargement. If water-rings form on the negative, remove the carrier and shake or wipe excess moisture from the negative before making further exposures.

When the necessary rush prints have been made, return the negative to the water and complete washing. Negatives removed immediately from the wash and placed in the enlarger are less liable to damage than negatives partially dried.

•

WASHING

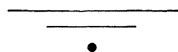
The washing process is of utmost importance to those negatives and prints for which a high degree of permanence is desired. The

CONTROL WHEN PROCESSING THE NEGATIVE

best hypo-eliminator is plain water. The water should circulate in such a manner that the hypo and other agents loosened from the negative or paper are carried out of the washing tank. Someone has suggested that the function of the first few minutes of washing is to wash the hypo from the emulsion and its base, and that the balance of the washing time is for washing the tank.

Films should wash for 30 minutes in clean running water (60 to 120 minutes for prints). If archive quality is desired for the films or prints, washing time should be doubled.

The temperature of the washwater should not exceed 70°. Wash-water which is too warm will cause reticulation, frilling, or clear spots of irregular shape from bacteria that grows on the gelatin.



DRYING

The drying step in negative-processing is more important than generally conceded, and needs more attention if good negative work is to be achieved.

The film as it comes from the wash contains water in the amount of 6 to 10 times the weight of the gelatin in the emulsion, therefore as much of the excess moisture as possible should be removed from the negative before it is hung to dry. Wipe this surplus from the negative with a viscose sponge, a clean, wet, soft, smooth chamois, or wet long-fibered cotton (discard the cotton after single use). Remove the negative from its hanger, as the hanger grooves may cause streaks or stress-marks from uneven drying along the edges. Careful wiping of excess moisture from the negative will be added assurance against sediment from water, and against the formation of hypo-rings which accumulate when water droplets, not entirely free from hypo, dry.

A GUIDE TO PHOTOGRAPHIC CONTROL

The drying air should be warm, dry, and clean. 78° to 87° is the recommended temperature range for the drying cabinet. A higher temperature tends to increase density and contrast because of a re-clumping of the silver grains. Negatives treated in a chrome alum bath may be dried in temperatures up to 120°.

In too dry an atmosphere the negative surface may dry before the underlying portions of the gelatin do, and the evaporation of the moisture from the gelatin nearest the film base will be retarded. This causes, among other problems, severe buckling of the film. The gelatin should never be completely dry, else the film will become brittle and easily broken.

More rapid drying can be accomplished by immersion of the negative in a 10 per cent solution of aerosol or some other similar wetting agent. This is better than the old method of soaking the negative in methylated spirit (or gin, in an emergency) before drying. Film should not be subjected to sudden temperature changes while drying. In cold weather, care should be taken to see that frost roses do not form on the wet negative, as these become a part of the negative pattern. Allowing 35-mm. films to cure for several hours after drying, in order to harden the emulsion surface, minimizes scratches and abrasion marks.

Properly dried negatives should then be carefully placed in envelopes for storage. Negatives should be kept in a cool, dry place. A basement or other damp place is fatal to negatives, for, among other things, a purplish fungi which cannot be removed grows on the gelatin.

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INTENSIFICATION AND REDUCTION

Negatives, like children, do not always turn out just as the fond parent hopes, and may need some degree of correction if they are to be useful. This is neither easy nor always entirely satisfactory, but it is usually worth trying. Just as child psychologists have scientific methods for correcting errors in child-raising, so photographers have scientific methods for making certain limited corrections of the errors of their brainchildren. The two principal negative corrections are *intensification* and *reduction*.

Intensification

When a negative is so thin as to make printing seem impractical, intensification is recommended. There are solutions into which the negative can be placed whereby, through further chemical action, any image on the negative will be intensified or built up to a greater degree of opacity. Intensifying also increases contrast. If there is no basic image, discard the negative and make a new one.

Some intensifiers involve bleach and redevelopment, while others, like the prepared Victor intensifier, require only immersion in the solution, a 10-minute wash in running water, and drying. This method may be preferable because most of the negatives needing intensification are news-type negatives (usually not possible to retake), where any expedient to get an acceptable picture is grasped. (Otherwise, retake the picture and profit from previous errors.)

One of the most convenient intensifiers that can be mixed in the darkroom is the Ansco Mercury Intensifier:

Potassium Bromide— $\frac{1}{4}$ oz. 35 grs.

A GUIDE TO PHOTOGRAPHIC CONTROL

Mercuric Chloride— $\frac{1}{4}$ oz. 35 grs.

Water to make—32 oz.

Use straight on thoroughly washed, wet negatives. Bleach image completely (remove any surface scum from the bleaching solution before use), wash in water containing a few drops of hydrochloric acid. Redevelop bleached negatives in any standard developer.

A chromium intensifier can be compounded as follows:

Potassium Bichromate—3 oz.

Hydrochloric Acid (concent.)—2 oz.

Water to make—32 oz.

For use, take 1 part solution to 10 parts water. Bleach negative thoroughly, wash 5 minutes, and redevelop in D-72, diluted 1 to 2. Wash thoroughly. Greater intensification is possible by repeating the process.

Reduction

Perhaps a negative, instead of being on the thin side, is too dense due to overexposure, overdevelopment, or both. If these faults prevent its yielding a good print, then the image can be reduced by converting part of the silver image into a soluble silver salt which can be washed away.

For reducing overexposed negatives, use a subtractive reducer which will reduce density and increase contrast. The old standby, Farmer's Reducer, is indicated:

Solution A

Hypo—8 oz.

Water to make—32 oz.

Solution B

Potassium Ferricyanide— $\frac{1}{2}$ oz.

70 grs.

Water to make—8 oz.

CONTROL WHEN PROCESSING THE NEGATIVE

To use, mix 4 oz. of Solution A and 1 oz. of Solution B in 32 oz. of water.

For negatives which are highly contrasty from underexposure and overdevelopment, use a flattening type of reducer, such as an ammonium persulfate reducer. This reducer works fastest on the high-lights. Watch this reduction carefully; prolonged reduction overthins the shadow areas. A stock solution is:

Water——32 oz.

Ammonium Persulfate——2 oz.

Sulfuric Acid (concent. pure)—— $\frac{3}{4}$ dram

Use 1 part stock to 2 parts water. When reduction is complete, immerse in a hypo bath a few minutes before washing.

Negatives which are too contrasty and too dense because of overdevelopment can be reduced by a proportional reducer, as follows:

Stock Solution B

Water——32 oz.

Potassium Permanganate——4 grains

Sulfuric Acid (10% sal.)—— $\frac{1}{2}$ oz.

Stock Solution B

Water——96 oz.

Ammonium Persulfate——3 oz.

For use, take 1 part Sol. A to 3 parts Sol. B. When the reduction is complete as desired, clear the negative in a 1% solution of sodium bisulphite. Wash the negative thoroughly before drying it.

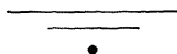
The Farmer's Reducer is almost a necessity in the laboratories of persons working with vigorous developers and highly sensitive films.

A GUIDE TO PHOTOGRAPHIC CONTROL

It is usually kept within easy reach of every newspaper and commercial photographer. A weak solution of this reducer applied to special portions of the negative by means of a small tuft of cotton or a camelhair brush is frequently a great aid to controlling density in small areas. Frequent applications, each followed by a running-water rinse, is the secret of controlled reduction without streaking.

It is possible, through careful handling, to both reduce and intensify areas of a negative. Reduce first; then, following a good washing, local intensification may be accomplished. In every case of intensification or reduction, be certain that the negative is well washed and free from hypo before starting controls.

The contrast of a flat negative can be greatly increased by first reducing it in a weak Farmer's Reducer, then following with intensification.



DYEING

A photographer may desire to make a picture devoid of background in a situation which precludes the use of a large neutral-tone backdrop. In this case, the use of an opaque watercolor or dye is indicated.

Indian-red color applied to the back of a negative by a good watercolor brush will render the negative completely opaque, and the subject can be printed with a paper-white background. Later the Indian-red opaque can be washed off the negative.

New coccin dye is another medium of background control. New coccin has come into use only in recent years, but it has proved to be one of the most helpful and inexpensive of darkroom aids. It can be used not only as a background control medium, but has frequently

CONTROL WHEN PROCESSING THE NEGATIVE

proved an excellent retouching aid. Do not use coccin dye on the emulsion side of the film; apply it to the back. Here is a recommended control with new coccin dye:

Obtain four 2-oz. medicine-dropper bottles and some distilled water. In Bottle No. 1 make a "stock coccin" by depositing 20 grains of new coccin dye and filling the bottle with distilled water. This solution appears blood-red. With the medicine dropper place 10 drops of stock coccin in Bottle No. 2, 20 drops in Bottle No. 3, and 40 drops in Bottle No. 4. Add 6 drops of aerosal to each bottle and fill with distilled water. When starting to work on a negative, begin with Bottle No. 4.

Apply the dye with a fine brush, or with a tuft of cotton on a toothpick, applicator, or orange stick. Use a very small amount of dye and rotate the applicator so as to make a smooth application. Rotate twenty-five or thirty times at each application. Once the base application of dye has been used, stronger amounts from the other bottles can be added, but underdo rather than overdo the application of the dye. This red dye holds back the light, and it is easy to use too much. If the dye should be put on too heavily, or in the wrong places, reduce it with 28% ammonia and put the film to wash in running water. (It is next to impossible to get the dye out of the emulsion, so avoid contact with that side of the negative.)

Through the use of new coccin, clouds can be worked into bald skies, and gray skies can be brightened.

RETOUCHING

The first step in retouching a negative is a careful analysis of the proof print—the bigger the proof, the better. With a pencil, mark the areas on the print to be retouched, being careful that only the essential retouching is indicated; too much knife- and pencil-work can completely alter the true intent of a picture. Purists argue against any retouching, but careful, restrained retouching will seldom hurt any portrait, especially if dramatic lighting has been used. The simon-purist would not approve of much control anyway, so take a good look at the proof print and the negative, and proceed. Necessary tools are:

1. Retouching desk;
2. Retouching knife (very, very sharp) ;
3. Oilstone (for sharpening knives);
4. Retouching fluid;
5. Retouching pencils (HH, HB, F, B);
6. Emery boards;
7. Fine emery cloth;
8. Small blotter stump;
9. Abrasion pencil;
10. Abrasion paste.

Necessary knife-work or other reduction must be done first. Very light reduction can be done with a reduction pencil, which is a core of resinous matter encased in a paper wrapper. Reduction is accomplished with this pencil by rubbing down the area to be reduced. Larger areas are reduced with an abrasion paste, which is rubbed on



Fig. 59

This is the author's retouching equipment including coccin dye solution, stone palate, retouching pencils, reducing paste and pencil, knife and brush, sharpening stone, emery board and paper for sharpening leads, retouching stand, negative brush, cotton rolled on toothpicks, retouching glass.

the negative with a fingertip or a bit of cotton on a stick. (Old-timers used to reduce local areas by rubbing a bit of lint from their coat on the negative.)

Knife-work is very delicate business; it requires the use of a very sharp knife in the very steady hand of a very careful person. The knife must be absolutely free of nicks. It is held in the same man-

ner as a pen, with the blade positioned virtually perpendicular to the negative surface. The negative is shaved very slowly, rather than cut. As the emulsion is only 1/1000 of an inch thick, this shaving must be done with dexterity.

When reduction is complete, the negative is ready to be prepared for pencil-work. The retouching fluid is applied first. This fluid is a fine varnish that contains a certain amount of resin to provide a tooth for the pencil. Dip an orange stick into the bottle of retouch fluid and apply the amount that adheres to the stick to the emulsion side of the negative. Wrap a piece of cleansing tissue or cotton on the tip of your index finger and wipe the negative dry. Allow the retouch fluid to cure and become hard, before applying the pencil. If there is great need of haste, keep hand or fingers from contact with the drying dope, and retouching can be started almost immediately. The negative is positioned on the retouch desk so that all areas except that to be worked upon are well masked.

The pencil, sharpened to a long thin point, is held very lightly and applied with light strokes. Some workers watch the pencil-work through a magnifying glass, others use the glass only for examining progress. (Some prefer the binocular type of magnifying glass that fits over the head like an eyeshade. The double lens arrangement permits close scrutiny of the work as it progresses.) Strokes should be so small and light that they are not visible as separate lines or dots. Every retoucher eventually devises a touch and stroke of his own, but it will likely be some kind of modified comma, or a tiny straight stroke applied straight or cross-hatched. It is not the purpose of the retouching stroke to block in the transparent areas, but to simulate negative grain, building up the density of the transparent parts to match surrounding areas of the negative.

Dramatic lighting usually discloses skin blemishes of the subject, and retouching to minimize these blemishes is a compromise one

CONTROL WHEN PROCESSING THE NEGATIVE

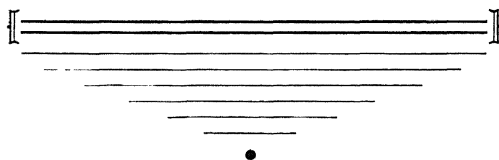
must make in order to achieve an acceptable picture. The retouching should knock off harshness and eliminate such blemishes as are only temporary defects—acne, a stray hair, and the like. Blending is done with the small blotting-paper stump.

Do not be content with a onceover job of retouching, but make more proofs and check progress.

If it is necessary to spot tiny holes in the emulsion, do this control on the back of the negative. Rub the film with a little pumice if the pencil is to be used. India ink thickened with gum arabic may be used on the tip of a fine brush or crow-quill pen for spotting pinholes. Coccin dye also may be used.

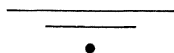
If large areas of control are necessary, use new coccin dye on the back of the negative, being careful to build up density slowly.

If the negative you desire to retouch is too small to permit control, make the best possible enlargement, copy it onto a larger negative, and retouch it. This enlarged and retouched negative can be used as the working negative, or can be again copied.



CONTROL WHEN MAKING THE PRINT

FORTUNATELY, as a still photographer you do not have to be entirely content with or limited by what a negative reveals in composition, evenness of illumination, or contrast. You still have many opportunities for control. This is particularly true if you choose to make projection prints, although there are some limited controls available to contact-printmakers. As the usual current procedure is to use small- to medium-sized cameras and make enlargements, this Part deals mainly with controls during the enlarging process.



ABOUT ENLARGERS

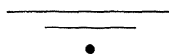
It is a common fault of photographers to spend several hundred dollars for cameras, more money and time learning how to get a negative, and then to dissipate all this expense by trying to make good prints with just any sort of enlarger. This leads to confusion and discouragement. The enlarger is a vital tool for producing good pictures, and negatives should be made to fit the enlarger, or an enlarger bought to accommodate the type of negative made. And let it be

CONTROL WHEN MAKING THE PRINT

hoped that the enlarger chosen will be a good one comparable to the quality of the good camera.

There are only a few modern enlargers which will accommodate films from 35 mm. to 5x7 in. with good results. If negatives of this wide range are deemed desirable, it probably will be necessary to buy two enlargers, one to accommodate 35-mm. to 2¼x3¼-in. negatives (with interchangeable condensers to match varying focal-length lenses), and another to accommodate 3¼x4¼ to 5x7 negatives.

It is a false assumption of photographers that any enlarger will be an efficient tool with any good negative if it will accommodate the size of the negative. Different types of enlargers require different types of negatives.



TYPES OF ENLARGER

Let's consider several types of enlargers. The illumination system is perhaps the most important part of the enlarger, and enlargers are classified according to this feature.

A *diffusion-type enlarger* accommodates a Cooper Hewitt or fluorescent tube, or a frosted-glass or opal bulb in a reflector, with an opal glass or ground-glass between light and negative to provide further diffusion. This enlarger requires dense negatives and is seldom effective with miniatures; that is, 2½x3¼-in. or smaller negatives. It is most effective when used on portrait or some types of pictorial work.

The *condenser-type enlarger* is one with a clear lamp, and double condensers or lenses between light and negative. This arrangement gives much contrast in prints and requires a softer negative. It is ef-

fective in commercial work and in all types of work demanding good contrast.

A *third type of enlarger*, and the one which seems to produce best results for modern photoists whose work reflects realism and enlarging control, is one with a slight diffusion type of light combined with a condenser system. This latter type is excellent for both small and large negatives, and for all-purpose work.

There are certain modifications of this latter type of enlarger worth noting. Some use diffusion bulbs and sets of condensing lenses above the film planes; others use diffusion bulbs and diffusion glasses over condenser lenses; or the flat surfaces of the top elements of the condensers may be ground for diffusion. Moderately thin, clear, brilliant negatives match this combination.

Next in importance to the illumination system of the enlarger is the *lens*. It is more convenient to have a separate enlarging lens of proper focal length to match the condensers of the enlarger; but, if necessary, the lens from your camera may be used when it is of proper focal length and adapted to this dual purpose. Few enlarging lenses are suitable as taking lenses, because of their flat field, and not all taking lenses are suitable for use as enlarging lenses. This is especially true of a wide-angle lens.

Rigidity is another important feature to be considered when choosing an enlarger. Tilting and swinging of the head is a convenient feature, but stability is paramount. The post (or journal) on which the enlarger is raised and lowered should be steady enough so that even when the lamp house is raised to its highest position, the support is rigid and the negative plane is perfectly parallel to the plane of the paper-holder. This assures sharp pictures free from vibration evidence, diffusion, or out-of-focus areas. If the enlarger's construction will allow both rigidity and controlled tilting, well and good; but if one of the features must be sacrificed, forget tilting, for

CONTROL WHEN MAKING THE PRINT

necessary perspective control can be achieved by tilting the paper-easel.

Something to remember about enlargers is that negative enlarging factors vary considerably with the three different types of tools. A negative that will print well on a given degree of contrast paper on a condenser enlarger, will not yield the same quality print on a diffusion-type enlarger if the same grade of paper is used. Negatives that yield good prints on No. 2 paper on condenser enlargers, will require No. 3 or possibly No. 4 paper on diffusion types.



MASKING

Another compensation of which it is important to be aware concerns the negative-carrier. Too often a photographer places any size negative in any size negative-carrier, then wonders why the result is flat or fogged prints. Something of print quality is always sacrificed when small negatives are placed in large negative-carriers without masking. No raw light should ever be visible around the edge of the negative (whether or not you use an enlarging paper-easel), for stray light from the enlarger can bend around the edge of the negative, or will reflect from the enlarger post, from clothing, from hands.

Masking is an easy and logical step of control here. Cut strips or masks from black paper (the envelopes in which paper comes is convenient). For example: You are using a 4x5 negative-carrier and wish to make prints from $3\frac{1}{4}\times4\frac{1}{4}$ or smaller negatives. Cut a black-paper mask the size of the negative-carrier, with an opening slightly smaller than the negative to be enlarged. Using sticky tape, fasten the mask in position over the negative and place in the carrier.

A GUIDE TO PHOTOGRAPHIC CONTROL

In some instances, blocks or strips of black paper are adequate to fill in around the negative. Just remember that a mask is vital to brilliant prints!



DIFFUSION DEVICES

When a sharp-focus lens is used in making a negative, the image will be very crisp and reveal much detail. Diffusion devices are then used, reducing definition when enlargements are made in order to:

1. Give the picture an atmospheric effect;
2. Eliminate some of nature's defects in the subject;
3. Minimize or eliminate the need for retouching.

Since the time when Mrs. Cameron first placed a piece of glass between negative and printing paper to scatter light rays, many diffusion methods have been tried. These include about everything from kicking the enlarger while the exposure is being made to vibrating a gut violin string in front of the enlarging lens. Neither of these methods is recommended, however. Some of the better devices and methods for diffusion include:

1. *Diffusion discs* manufactured commercially of plastic or glass and placed over the enlarging lens. These are available in varying degrees of diffusion. They require slightly longer than normal exposure, and make a slightly less contrasty print.
2. *Screens*
 - (a) A piece of fine net sealed between two glass discs held in place over the enlarging lens;

CONTROL WHEN MAKING THE PRINT

- (b) A silk stocking stretched over an embroidery frame and held between the enlarging lens and paper;
- (c) Fine-mesh copper wire held between enlarging lens and paper.

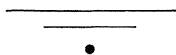
3. *Cellophane devices*

- (a) The famous Belgian pictorialist Misonne developed a device of cellophane covered with depressions such as are made in soft metal with a ballpen hammer, and perforated with many small holes or slots. In use, about $\frac{1}{3}$ the regular straight exposure is allowed, then the device is brought over the enlarging lens. The irregular surface diffuses the light rays, while the perforations allow some of the unbent rays to strike the paper. In some instances, where greater diffusion is desired, the device is fastened or held over the enlarging lens for the full period of exposure;
- (b) The cellophane wrapper from a pack of cigarettes may be crumpled, then, after $\frac{1}{3}$ to $\frac{2}{3}$ straight exposure, held in front of the enlarging lens for the remainder of the exposure time. The degree of diffusion is controlled by varying the ratio of straight exposure and diffused exposure, by varying the degree to which the cellophane is crumpled, and by varying the distance the device is held from the enlarging lens. The cellophane should be changed frequently, as it collects dust and fingermarks, thus cutting its light-transmitting qualities. (When using this device, select enlarging paper of one grade higher contrast than normal, as the cellophane tends to flatten paper almost one full grade.)

- 4. *Oil smeared on a glass plate* held in front of the lens may give desired diffusion. One oldtimer made it a practice to

smear a fine oil over his negative for a similar effect. *Not* recommended is the early practice of smearing a drop of oil on the lens with the fingertip, or spitting on the lens.

5. *Smoke*, though difficult to control, sometimes creates a desired effect when blown across the enlarging lens during projection. (It is successfully used to create atmosphere in amateur movie-making.)
6. *Manipulation of enlarger*. Not recommended, except for experimentation (as abstract photography), is the practice of pulling the enlarger slightly out of focus to make the picture lack sharpness and create an appearance of diffusion.



TEXTURE SCREENS

There are a number of texture screens available commercially, including those with etched lines and photographic copies of special surfaces. Most of these commercial screens are made in 8x10 or 11x14 size for direct contact with the paper's emulsion. They are on a moderately heavy film base, and will last for years if properly handled. They should be kept free from finger- or abrasion-marks, water-spots, and dust, like any valuable negative; and should be given the same care in filing when not in use.

In use, these screens are placed in contact with the enlarging paper, the emulsion side of the screen in contact with the emulsion of the paper. A clean, thin plate-glass laid on top of the screen holds it in perfect contact with the paper. An exposure about 25 per cent or more longer than normal is recommended, and it may be preferable to use a grade higher contrast paper. In most instances, high-contrast negatives give best results with texture screens.

CONTROL WHEN MAKING THE PRINT

Etching screens are available in several textures. Jack Powell screens are available in course and fine etching textures. The Mortensen etching screen is best used on large subjects with mass light and shade. Mortensen recommends special lighting, exposure, and development for negatives which are to be used with his screens. Likewise, he recommends considerable subsequent work on the finished print.

One need not be limited to the commercially available photographic screens, however, for there is a wealth of fabrics and materials of varied textures that can be used. One of these is Japanese paper, a thin, spiderweb-like paper that can be placed in contact with the emulsion side of the photographic paper. Cushion sheets used in cutting mimeograph stencils are of similar texture. Other usable materials worthy of experimentation include bridal net, silk stockings, lace, fine wire, and stack sheets such as are used by commercial artists. Most of these mediums, however, are much more opaque than regular photographic texture screens, so considerably longer exposures will be required.

Imaginative photographers can make their own photographic texture screens. Any texture that can be photographed can be made into a texture screen. Light the texture subject with not more than 45°-angle illumination to get sharp textural quality in the negative, and underdevelop for low density so that the screen will be thinner than the negatives with which it is to be used.

Source materials for making photographic texture screens are burlap, monk's cloth, rough plaster walls, silk, driftwood, and many others. Just remember that when the screen is photographed on a small negative, in projection the texture pattern will be enlarged along with the picture. Therefore the photographic pattern must be very small, or the texture screen very large.

EXPOSURE CONTROL

Flashing

One of the simplest yet most effective exposure-control devices is the use of flashing. This means directing extra light to fall upon selected areas of the enlarging paper after the normal exposure is made (Fig. 60). This may be accomplished in one of the following ways:

1. After the normal exposure has been made, remove the negative from the enlarger. Shade with a piece of cardboard or your hand the areas where darkening effect is not desired, then turn on the enlarger light. Move hand or card up and down between enlarger and paper, so that there is no sharp line or ring of exposure. Only a short additional exposure should be required;
2. Remove the normally exposed paper from the enlarger easel and, after covering the areas where normal exposure is adequate, use a 7-watt lamp about 15 inches from the paper to flash in more light;
3. While the paper is still in the enlarging easel after normal exposure has been made, flash the area to be darkened with a pencil light. (Put a cone of paper over the light so that the light rays are not scattered.) ;
4. After development has been started, flash with a pencil light while shading the normal area with hand or cardboard. This is also effective to darken corners;
5. A beam of light from a tiny flashlight or a light such as is used by doctors to examine throats can be directed onto a very small area to be darkened. Considerable care must be

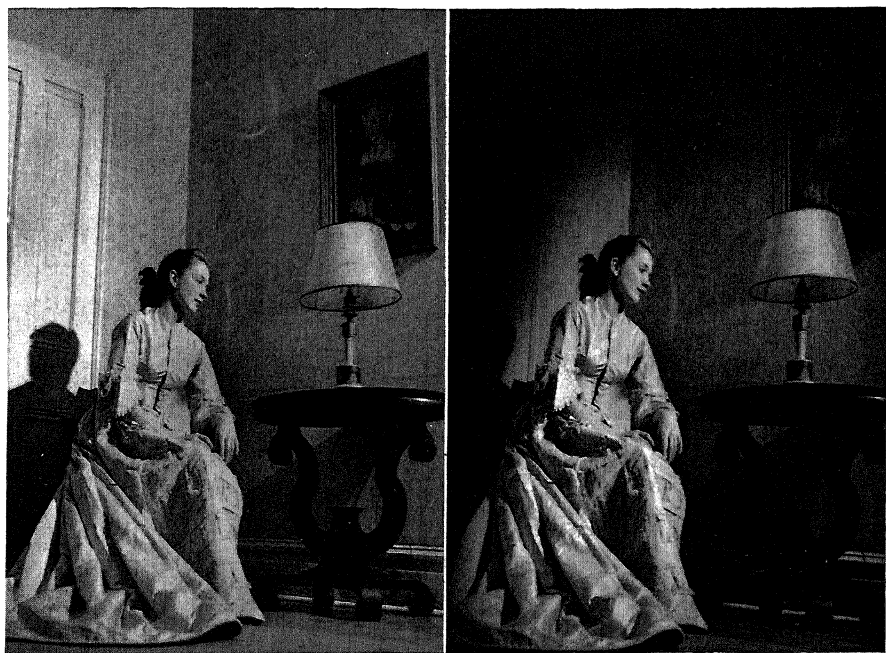


Fig. 60

The simple device of flashing was used to change the commonplace picture at left to the more interesting one at right. In the second picture the normal exposure was made then the negative was removed from the carrier and the enlarger light turned on for a few seconds while a piece of cardboard on a wire (see Fig. 61) was held close enough to the enlarger lens to shield the main picture area. The print was then developed in the normal manner.

taken to prevent fogging areas of the print where only normal development is desirable.

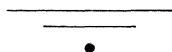
Practice will reveal just how long an exposure is required to obtain given darkening effects.

Printing-in

Printing-in is the process of adding exposure time to selected parts

of the enlargement beyond the normal all-over printing time. Most common methods are:

1. A large card with a hole in the center is held between lens and paper. A small light-beam from the enlarger lens is directed through the hole to a special detail of the picture; the card holds light back from the remainder. A slight rotary or an up-and-down motion is used, so that the printed-in spot will blend into the surrounding area and prevent the control from being obvious;
2. Cup the hands in such a manner as to form a sort of light funnel between enlarging lens and enlarging paper. Loosening or tightening the hands broadens or restricts the area receiving the light;
3. Swing the flat of the hand forward and backward between enlarger and paper to print in sky areas after normal exposure time is finished.



FOCUSING

Focus with the lens wide-open. Pick out the most contrasty item in the picture—eyes, stripes, a light button against dark material, a line—as the focusing point. If you have a soft negative and there is any question as to sharpness of focus, use a magnifying glass to make certain. Then, when sharp focus is definite, stop down the lens to the desired aperture and make the exposure.

Stopping-down is reducing the aperture of the diaphragm of the lens. This lets the light through more slowly, increasing exposure time, but increases sharpness and contrast, just as stopping-down the camera lens gives greater depth of focus and better detail.

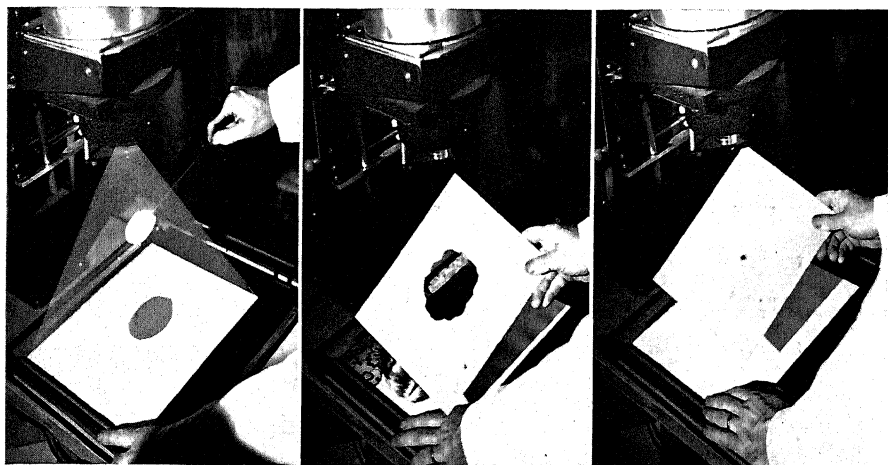


Fig. 61

Three commonly used devices for enlarging control are (left) a piece of cardboard on a wire to hold back exposure in thin areas of a negative; (middle) a cardboard with a large hole in it to increase exposure in large areas, and (right) a cardboard with a very small hole in it to permit additional exposure in small areas.

It is best to do the focusing on the same weight paper as that to be used for the print.

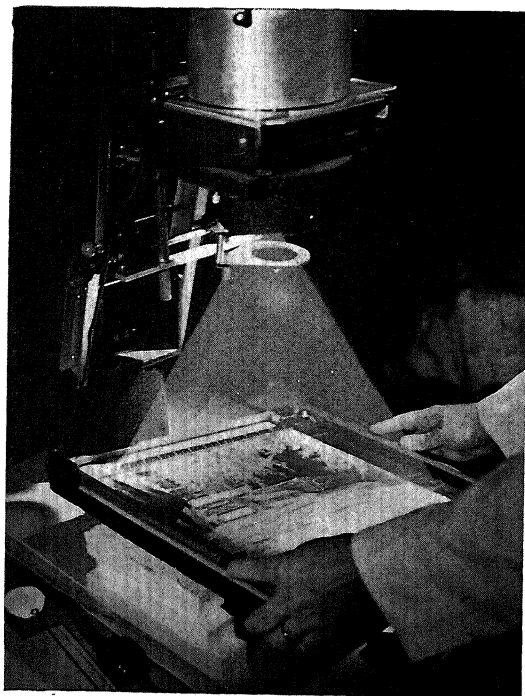
In the case of a very dense negative, rack the enlarger to project the desired image size on the enlarging easel, adjust it to an approximately proper focus, then substitute a thin negative or an old heavy negative on which lines have been scratched through the emulsion to obtain accurate focus. When this fine focus is obtained, replace the dense negative, stop the lens down if desired, and make the exposure.

DISTORTION CONTROL

Faulty or exaggerated perspective in a photographic image may be corrected through simple enlarging control. With the same type of control, distortion (sometimes desirable for special effects) may be achieved. When a camera without a tilting, or rising and falling, front is used to photograph a tall building at close range, the resulting photographic image is distorted: the top of the structure, being farther from the camera than the base, seems smaller than it should. This effect can be corrected when the enlargement is made by tilting the easel so that the projected image of the top of the building is

Fig. 62

Distortion in a negative can be corrected by tilting the easel during exposure. The easel can be held at the proper angle during exposure by several wooden blocks under one end of the easel. When using this method of distortion control the enlarging lens must be stopped down to a very small aperture to increase the depth of focus so that the all-over image on the enlarging paper will be sharp.



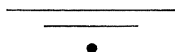
CONTROL WHEN MAKING THE PRINT

farther away from the enlarging lens than is the bottom. Focus the image in the middle of the board and stop the lens aperture down as far as possible to bring both ends of the building into sharpest focus. Figures are elongated for special effects by this easel-tilting.

The easel should be propped very rigidly during the exposure, to provide a general sharpness in the final print.

Big Ones

If exceptionally large blowups are desired, the enlarger is clamped or weighted to a table, and the head swung around so that the image is projected on the easel, which may be placed on a low stool or chair or the floor. When the enlarger head is so completely extended and the weight so unevenly distributed, you must be very cautious not to hit the enlarger. Even walking on the floor may cause trouble during the making of the long exposures necessary for big blowups.



CHOICE OF PAPER

Paper talk can be not a little confusing to the uninitiated, for there are so many different kinds. And probably few of us take full advantage of the helps available through the wide choice of controls which manufacturers have made possible in paper. There are three paper characteristics which the photographer needs always to bear in mind when choosing the paper for the job at hand: *surface*, *speed*, and *contrast*.

Surface

Manufacturers make papers in three general surface classifications: glossy, semi-matte or velvet, and matte or rough. They go farther and

make a variety of textures or finishes. The best and really the only way to appreciate fully the differences, is to examine samples of each type, and, by use of imagination and experimentation, learn to suit surface to job.

The intent of a print governs surface choice. Record, and newspaper and magazine photography employ glossy paper exclusively. Portraiture, salon work . . . any photograph wherein the aesthetic qualities of the subject dominate, may project well on one of several different surfaces and tones.

Light and tone, as well as texture, define surface. Brilliancy and fidelity of detail (including texture) add up to realism; therefore a paper with a basic color tone, surface, and finish capable of reflecting maximum light is most desirable for realistic photography. This, for most practical purposes, will be a black-toned print on glossy paper that has a light reflection power of 50:1. A contact print, gold-toned and glazed, will have a maximum reflection power of 100:1. A carbon print (black) has a luminosity range of 40:1; photogravure, less than 35:1; and black matte surface prints from 15:1 to 20:1. The range of type impression is only 10:1 to 35:1.

Consideration of the light-reflecting qualities of various papers suggest reasons why such critical workers as Edward Weston, and most advertising art photographers, make 8x10 negatives for contact-printing on glossy paper.

The effect of brilliance can sometimes be achieved by weakening detail in the brightest part of the highlights of a picture. This is the theory back of a method of spot diffusion, but unless such control is deftly handled, the print becomes cursed with a general effect of flatness. A slight yellow tint may add zest to a sunshiny picture; a slight blue tint to a night picture. Anything more than a tint, however, may ruin an otherwise good photograph.

CONTROL WHEN MAKING THE PRINT

Speed

The speed of a paper, like the speed of a film, refers to its sensitivity to light. There are three recognized speed classifications:

1. *Bromide*—a fast paper giving good black tones; requires a fairly dense but brilliant negative for finest results;
2. *Chlorobromide*—a medium-speed paper giving good warm or cold tones; requires a less dense negative;
3. *Chloride*—a slow paper usually used for contact, or for very long exposures to enlarge very thin negatives.

These three papers will vary with individual manufacturers' standards, and not all paper of any one of the three kinds will have identical speed or tonal characteristics. Considerable confusion can be prevented by standardizing with one brand of paper, keeping several grades and surfaces of this single brand on hand to meet all requirements. To choose the single brand, purchase a few packets of different grades of at least three brands, and test them on a good negative. Give each a fair test by developing it in the developer recommended by the manufacturer.

Contrast

Contrast or grade in paper refers to the tonal scale, which in turn involves speed or light-sensitivity. Papers for average use range from the very soft No. 1 (used with high-contrast negatives) to the very hard No. 4 (used with flat negatives). No. 2 is considered a "normal" paper.

The *grade* of paper selected for printing or enlarging determines the contrast and the tonal scale of the print, in relation to the tonal scale of the subject obtained from a given negative. This latter is a fixed factor, and can be only slightly altered by development processes. It is almost impossible to obtain in the paper print the long

A GUIDE TO PHOTOGRAPHIC CONTROL

tonal scale of the negative, and as near a proper contrast of paper as possible is desirable for satisfactory print-making. The choice of grade in paper is dictated by negative quality, though influenced by print intent.

One of the first steps in making prints or enlargements is to classify a negative according to contrast and density. A flat negative (one lacking in contrast) may be either thin or dense, but the overall tone has little variation. Likewise, a hard, contrasty negative may be dense or it may be thin.

The confusion that arises over paper grades is second only to the confusion one feels with what developer to use. Just remember that the grades of paper are not named to match negatives, but to indicate the degree of contrast they produce:

<i>Negative</i>	<i>Result Wanted</i>	<i>Paper to Be Used</i>
Soft or flat (lacks contrast)	Increased contrast	Contrast (#3) Extra-contrast (#4)
Normal (proper contrast)	Normal tonal scale	Medium (#2)
Hard or contrasty	Reduced contrast	Medium (#2) Soft (#1)

Just as the choice of paper depends upon the intent of the picture and the negative quality, so is it possible (even requisite) to make a specific kind of negative for use with a chosen paper. This can prove excellent exercise for developing photographic sophistication.

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TIMING

Test Strips

The most inexpensive and efficient method of determining the proper exposure for a selected piece of enlarging paper is to make a test strip. All that is needed is an accurate timer (an electric timer on the power line to the enlarger is the most efficient device) and a piece of the paper you expect to use for the final print. As emulsions differ from package to package, it is not satisfactory to use test strips from one package of the same grade and brand of paper as guides to the quality of a different package. Small 1x5-inch strips can be used, but a 3x5-inch piece is much more satisfactory, especially when making prints 8x10 or larger.

Procedure. Have at hand a 5-inch test strip and a piece of cardboard somewhat larger than the strip. Put the enlarger in focus and stop down to the desired aperture. Flip the red filter over the lens and place a test strip on the easel so that the principal point of interest of the picture will fall upon it. Turn off the enlarger light, flip the red filter out of the way, and set the timer for 35 seconds. Start the timer as you turn on the enlarger light, and expose the entire test strip for 5 seconds. Next, quickly place the cardboard over the test strip so that it shields 1 inch of the paper from the light for 5 seconds. Move it along a second inch for 5 seconds; then a third inch for 10 seconds; then a fourth inch for a final 10 seconds. Flip off the light and develop the strip for 2 minutes at 70°. Rinse, fix quickly, and examine the strip under a good light.

The test strip should show 5 gradations of tone. They will vary from lightest (the first inch, exposed for 5 seconds) to darkest (the

last inch, exposed for 35 seconds). From this experiment select and judge the time that gives the best print.

It is possible that none of these times is exactly correct for your purpose, but by selecting the two nearest ones and giving your print an exposure halfway between, you will have enough latitude in development to give a print that is right on the nose. If the 35-second exposure fails to give the desired quality, use another test strip and repeat as before, using a basic 25-second exposure instead of a 5-second one—unless it appears that refocusing, stopping-down, or another choice of paper is indicated.

These time factors are for bromide or fast chlorobromide papers. Double experimental exposure times for the slower chloride papers. If these doubled exposures fail to produce desired quality, double them again for further testing. Somewhere there is a paper-developer-exposure-focusing combination that will give at least an acceptable print from most negatives.

Test strips can also be used to determine correct exposure for unusual effects, as when overprinting is desired in certain areas for drama; and when combination prints are made in the enlarger.

Recapitulation

The quality of the final print made from an acceptable negative is directly related to correct exposure in printing. The exposure is correct when the paper, developed for the time recommended by the manufacturer in a suitable developer at a recommended temperature, produces a print of proper scale and tonal quality. Controls for securing best quality prints are:

1. Proper exposure with negatives well masked;
2. Full development at proper temperature;
3. Fresh developer;

CONTROL WHEN MAKING THE PRINT

4. Developer kept free from hypo or short-stop contamination (hypo kills blacks and gives prints a greenish cast);
5. An adequate, safe safelight;
6. Proper short stop and fixing.

Additional controls so far as print tone are concerned are:

1. Use a developer mixed with less bromide than the formula calls for; this gives blue-black tones (too much reduction, however, tends to fogging);
2. Bromide is a restrainer, and a few drops added to the developer guards against fogging, helps to keep whites clear;
3. Increase the carbonate to increase blacks; this activates the developer and may tend to stain and fog if development is prolonged.



DARKROOM EYES

Print quality is certain to benefit from uninterrupted darkroom sessions, providing that you are sparing with the white light. You see better, and consequently are able more accurately to judge prints, when your "night" eyes become adapted to the dim light of the darkroom, and that adjustment is undisturbed with bright light. You see with cones of the eye retina in daylight, but with the rods in dim light or at night. The rods of the eye are a thousand times more sensitive than the cones, but they require almost 30 minutes to become fully adjusted to the dark. The striking of a match to light a cigarette, the brief flashing of white light to locate a misplaced negative, may impair maximum vision for another half-hour.

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CONTROL OF DEVELOPMENT

Here are some recommended controls in print developing:

1. Start development in a diluted solution of developer; when all the image is visible, complete the development in full-strength normal developer. This increases tonal range and gives greater opportunity for observing development.

2. Soak the exposed enlarging paper in water so that it is completely saturated and limp. Place the paper (emulsion side-up) in a tray and pour a small amount of fresh developer over it. Rock the tray until development is complete. Use fresh developer on each print. The British use this method a great deal. It insures an always-fresh developer, tends to fuller tonal range.

3. Keep a small vessel of undiluted developer stock near the developing tray. Apply this undiluted developer by means of a cotton swab or camelhair brush to local areas of prints needing fuller development.

4. The warmth of the heel of the hand placed under an area needing intensification may increase development.

5. Warm breath blown through a soda-straw onto small areas will increase local development. British photographers use steam brought through a rubber tube from a flask partially filled with water and set over a spirit lamp.

6. A wad of cotton kept in the short-stop tray can often be used to stop development of local areas while development continues elsewhere. A print that has received an application of short stop must not be returned to the developer. If further application of developer is needed, apply it with a tuft of cotton. Place the print on a piece of

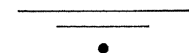
CONTROL WHEN MAKING THE PRINT

tempered masonite or an old ferrotype plate, and you will find that this developer-short-stop control can be easily handled.

7. Some darkroom technicians keep a solution of potassium bromide and a solution of carbonate on the shelf above the sink. It is expedient to keep the bromide in a bottle fitted with a medicine dropper, so that a few drops may be added to the working solution to slow down fast papers, to prevent fogging and keep the whites clear, and to impart a warm tone to the print. A slight increase in contrast is achieved through this control. To make the solution, use $\frac{1}{2}$ -oz. of potassium bromide to 5 oz. water.

The addition of carbonate to the paper developer accelerates development, and, properly handled, produces good rich blacks. It can be added to developer which has been used for several hours or let set overnight (covered), and will considerably freshen the working solution. To make the stock carbonate solution, mix 2 oz. of sodium carbonate to 32 oz. of water. Add from 2 to 8 oz. of this stock to the working solution.

Because of their varying characteristics, one might say that the carbonate is a positive and the bromide a negative control. Carbonate is the accelerator, bromide the restrainer.



DEVELOPING

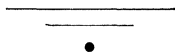
Just as it is best to start negative development with formulæ recommended by the manufacturer, so is it best to learn how to use a given paper with its recommended developer. Only when this is mastered can experimentation be in order. Be sure that the stock solution is diluted to the recommended percentage for the working de-

veloper. This percentage varies considerably with different developers and papers, a fact frequently overlooked.

Learn to mix formulæ and time exposures so that prints can be kept in the developer for 2 minutes. This is time enough to permit full development and allow for controls. Contrast can be altered by varying the developing time and by varying the ratio of stock to water, as well as by the bromide or carbonate treatment.

Put paper into the developer by sliding it in face-up, so that it is quickly and evenly covered. Rock the tray, or, with print tongs, grasp one corner of the paper and agitate it in the solution for at least 45 seconds. Development should be well underway before the print is lifted for examination. Development should continue for at least 11½ minutes, but with most papers preferably for not more than 2 minutes. It is possible to develop a print longer, and under some circumstances it may be advisable to carry development for as long as 4 minutes. Not all paper will allow this extended development without fogging, so be sure of the paper before attempting such forcing.

It is possible to increase the contrast of paper slightly by giving it a little longer exposure and pulling it more quickly from the developer. Also, weakening the developer increases the contrast. Strengthening decreases contrast. Another means to contrast is to cut the aperture in the enlarging lens to a smaller stop, make the exposures on an approximately normal basis, and force development by prolonging the time the paper is left in the developer.



JUDGING PRINT QUALITY

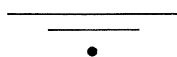
One of the most common wishes of photographers is that the finished dried print might be as brilliant and have the quality of the

CONTROL WHEN MAKING THE PRINT

wet print; but this is a wish impossible of fulfillment except in unusual cases. It necessitates learning to judge print quality in developer and hypo. Prints should be examined in the hypo because some papers change tone when fixed. This is particularly true of certain brands and certain kinds of paper. Nearly all papers dry down darker than they appear in the developer, so when the print appears fully developed and is still brilliant, it is probably time to "jerk it."

Commercial prints and those intended for reproduction should be slightly lighter in tone and of higher contrast than prints intended for exhibition work. Most exhibits are judged by placing the prints in a well-illuminated viewing box, since they look best under these conditions. The best qualities of good prints show up in the viewing box, but bad prints look their worst: flat tones, abrasion marks, pinholes, and other "bugs" are revealed as clinically as the scars of a crime suspect in the police show-up.

A valuable expedient, when many prints are to be made from the same negative, is to make a perfect print, fix it and rinse it, then lay it in a tray of water near the developing tray. Subsequent prints as they are developed can then be compared with the "mint copy" in the water. (Since you know exactly how many seconds are required for enlargement, expose all the prints at one time but do not try to develop more than three or four at a time.)



STOP BATHS FOR THE PRINT

Mind your p's and q's when completing the process of making a good print. You are less than half done when the print is lifted from the developer and placed in the short stop. (The use of short stop should never be omitted.)

A GUIDE TO PHOTOGRAPHIC CONTROL

Use 1 to 2 oz. of 28% acetic acid to 1 qt. of water for the stop bath. This should be made up fresh daily, and if it shows any signs of exhaustion it should be immediately discarded to prevent spots and streaks, and a fresh short stop prepared. (Use the taste test—when it loses its bite, it's dead.) Prints should be completely and quickly immersed in the short stop, and left there for from 4 to 10 seconds, never longer than 5 minutes, lest the paper become fogged.

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FIXING

Place the prints face-up in the hypo solution and agitate them for a few seconds. This is to make certain that the hypo comes in contact with the entire surface of the print. If the hypo is fresh, it is necessary to leave the print in it for only 5 to 10 minutes for complete reduction of the unexposed silver. The fast bromide papers can be fixed in the minimum time; the slower chlorobromide prints require the maximum.

Some photographers use the same hypo for both films and papers, but this is not considered good practice. Worse still is the practice of dumping hypo that has been used for negative fixation into a tray to save for paper-fixing. It is just as important that you work with fresh hypo for print fixation as it is to have fresh, uncontaminated hypo for negatives.

There is a hypo-saving procedure, however, that is very efficient and economical. That is the use of two hypo trays. Place prints in the first tray of hypo for the first 2 to 5 minutes, then transfer them to the regular tray of hypo for the finishing fix. The second hypo solution will then remain good for a large number of prints. This procedure is highly recommended for laboratory workers who must

CONTROL WHEN MAKING THE PRINT

make hundreds of prints daily, as in commercial print-finishing or postcard manufacture. The procedure also seems to make for better glassing of prints on large drum driers. Likewise, this kind of hypo treatment is recommended for processing archive-quality prints which are expected to last for many years (provided, of course, they are adequately washed).

A good hypo bath for prints follows:

Hypo——38 oz.

Water (about 125° F. or 52° C.)——96 oz.

Slowly add the following hardener solution to the cool hypo solution, stirring the latter rapidly:

Water (about 125° F. or 52° C.)——10 oz.

Sodium Sulphite (anhydrous)——2 oz.

Acetic Acid (28%)——6 oz.

Potassium Alum——2 oz.

Dissolve chemicals in the order given, and

Add water to make 1 gallon.

This fixing bath, prepared as instructed, will fix approximately 120 prints per 128 oz. (or the equivalent in square inches of emulsion surface) if the acid rinse bath is used between developer and fixation. The temperature of this acid-hardening fixing bath should be kept as near 70° as possible.

WASHING

Some photographers seem to have a Jeeter Lester complex about water—they use so little of it. A quick rinse is adequate for prints

intended for immediate reproduction, but a good washing of prints is necessary for real preservation. Take a look at some prints a year or so old. If they have been poorly washed, they will be yellow or streaked. After a valuable negative is lost or damaged, and a badly stained print is all that remains, the value of good washing will be realized.

Single-weight prints may be washed for thirty minutes for fair preservation, although an hour is better. Large double-weight prints should wash for an hour to two hours. All print-washing should be done in such a manner that the hypo is removed from the tank and the water completely changed every few minutes. Hypo is heavier than water, therefore a washer in which the outlet is low in the tank is the more efficient type. A tray siphon is an extremely efficient and inexpensive gadget for this purpose. Prints should be moved and shuffled frequently, to insure complete washing of all areas including the back of the print, which also absorbs hypo.

Once the timing of the washing of a batch of prints has begun, do not add any more prints from the hypo. Washing time should be calculated from the time the last print is placed in the washer. When a batch of prints has washed for an hour, one print taken from the hypo and added to the washwater will carry with it enough hypo to contaminate all the other prints in the washer.

Be careful that the washwater does not get too warm. A temperature rise may cause frilling or blistering. Keep washwater as near 70° as possible. If too cold—less than 65°—longer washing is required.

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DRYING

Chrome surfaces are the most commonly used drying media for glossy paper. When prints are to be placed on a chrome drying plate, be sure the plates are clean. Wash them with clean, hot water, dry and polish them with clean cheesecloth. When using an electric or gas drier, do the cleaning while the chrome surface is cool.

Place glossy prints in a bath of gloss solution for about 5 minutes or longer. This treatment is not absolutely necessary, but the dried prints seem much easier to handle, curling less than when the gloss bath is omitted. It is also a good idea to apply some of this solution to the drying plates occasionally (be sure the plate is cool), then polish with dry cheesecloth.

Lay the glossy prints on the plate, emulsion side to the polished surface. Use a long rubber "squeegee" or a roller (the former being preferable), and gently but very firmly press the print to the plate, expelling all air bubbles and as much water as possible. Wipe surplus moisture from the plates and the backs of prints. Set the plates in a warm, dry place—in not-too-hot sun, a drying cabinet, or on an automatic drier.

Matte prints may also be placed in the gloss solution if desired. The surplus moisture is swabbed from the surface of the prints before placing them to dry face-down on blotters or cheesecloth frames. If heated driers are used, place the prints so that the backs are next to the polished surface of the drier. Photo blotters may be placed in contact with the emulsion side of the prints before the apron on flat-heated driers is fastened in place. Do not use plates or blotters on belt driers. Place matte prints with the emulsion side to the can-

A GUIDE TO PHOTOGRAPHIC CONTROL

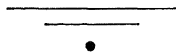
vas belt. Matte prints should be dried slowly (with low heat), else they become stiff and dry, with wavy edges. They should be slightly limp when taken from the drier, then suspended by two corners in clips or clamp clothespins from a wire stretched across the darkroom. Laying them face-down on the clean cheesecloth drying frames is quite satisfactory.

Blotter rolls, providing they are faced with clean linen and have corrugation layers adequate to permit free passage of air, also are good driers for non-glossy prints. Blotter books or stacked blotters are not entirely satisfactory, as they prolong drying time and do not contribute to even drying.

If prints become too dry, moisten the backs slightly with wet cotton or a sponge, and place them between blotters under a plate-glass or other large flat weight.

Once dry, the prints are ready for spotting and mounting. Unless the print is to have further treatment, dry-mount it with dry-mounting tissue (follow directions) upon a piece of cardboard. This gives the print a good flat appearance, and begins the dressing-up or real finishing.

If chemical control is indicated or desired, leave the print unmounted until all such work is complete. Although chemical treatment may be begun on the wet print, it is best to dry the print and examine it thoroughly before deciding upon further controls.



DRESSING UP THE PRINT

Though much of the quality of the finished print depends upon the negative from which it has been made, through careful control a great deal can still be done for a picture after it reaches the print

CONTROL WHEN MAKING THE PRINT

stage. Some workers, particularly those who specialize in exhibit prints, use the negative principally to record form; they do most of the control on the print. In nearly every instance, a print, whether intended for reproduction, exhibit, or sale, requires some additional control work—if no more than spotting—because the perfect print direct from the darkroom sink is a rarity. However, unless you are willing to devote considerable time to meticulous training in the use of chemicals, and in a special art form that resembles etching, confine your principal exercise of controls to the making and use of the negative.

Print Intensification

Prints as well as negatives can be intensified, although there is nothing quite so satisfactory as a print made right in the first place. Better discard several prints, striving for one good one, than go through the mumbo-jumbo of print intensification for routine work. Yet there may be times when print intensification will result in a superior picture, and the process is a good thing to know. The following method may be carried out in usual darkroom illumination:

1. Mix stock solutions for a chromium intensifier (none of the other intensifiers suitable to negative work will be satisfactory for prints) .

Stock Solution A

Water (distilled) —16 oz.

Potassium Bichromate—1 oz.

Stock Solution B

Water (distilled) —16 oz.

Hydrochloric Acid
(c.p.) —1¾ oz.

2. Mix together 1 oz. of Sol. A, 1 oz. of Sol. B, and 6 oz. of water. The print is first bleached by soaking it in this solution. Lay it in the bottom of a tray, pour bleach over it, and rock the tray continuously until the image fades or is bleached. This may re-

A GUIDE TO PHOTOGRAPHIC CONTROL

quire several minutes, and a strengthening of the bleach from the stock.

3. Wash print for at least 1 hour, so that all traces of the bichromate will be eliminated. Redevelop in standard paper developer and wash for 1 hour.

4. This process usually softens the emulsion, so handle the print carefully. When the washing is completed, drain the print and lay it on a blotter or cheesecloth frame to dry.

Print Reduction

There are two types of print reduction worth discussing: chemical reduction, which is a wet method; and abrasion work, which is used on the dry print. Chemical reduction is the most practical for reducing large areas.

1. *Chemical reduction* is a bleaching process based upon the principle of reduction of the photographic image created by silver deposits; it involves controls ranging from chemical spotting and local control to all-over print reduction. Chemical spotting is done by working on a perfectly dry print with a fine-pointed brush, with Farmer's Reducer, and with several small sharp-pointed, wedge-shaped pieces of blotter.

To reduce small black spots, apply Farmer's Solution with the brush, sparingly. Use only the tip of the brush and wipe out surplus moisture before bringing it into contact with the paper. Watch reduction carefully, and when the bleaching is effected, take up surplus moisture with the tip of the wedge-shaped piece of blotter. When all the spots have been removed, wash the print for 10 minutes, fix in plain 4-to-1 hypo, then wash for 1 hour. (After the spotted print is dry, the tiny white spots resulting from the reduction must then be filled in with spotting color.)

Local reduction can frequently be used to accent dramatic effect.

CONTROL WHEN MAKING THE PRINT

To prepare a print for local reduction, soak it thoroughly, then drain and lay it, emulsion side-up, on the bottom of a tray or on a piece of glass. Wipe the surplus water from the face of the print until it is almost dry. Dip a tuft of cotton into the reducer and hold this saturated pad on the area to be reduced. In a very short time, lift the pad and flow a stream of water over the print to wash away reducer. If more reduction is needed, repeat the process, reducing a little at a time. Merely lay the saturated cotton on the area to be reduced; never rub, for the emulsion, weakened by the liquid, is easily damaged.

If reduction does not appear to be progressing, strengthen the reducer. When reduction is complete, wash the print 10 minutes, fix in plain hypo, and wash for 1 hour before drying.

When all-over reduction for brightening a print is desired, soak the print, lay it in the bottom of a tray, and flow a solution of 6 oz. hypo and $\frac{1}{4}$ -oz. ferricyanide solution to 60 oz. water over the print. Observe the action carefully. Rock the tray constantly, and in about 10 seconds transfer the print to a tray filled with running water. Examine the print, and if reduction is not complete, return it to the tray of reducer but let reduction progress slowly and examine often. If repeated bleaching and washing does not give the desired result, strengthen the working solution. When reduction is complete as desired, wash the print 10 minutes, fix in 4-to-1 hypo, then wash for 1 hour before drying.

If the print has become stained during reduction, soak it in a 5% solution of sodium bisulphite before the final wash.

2. *Abrasion work* is more destructive of the textural quality of the subject than chemical reduction, and is less suited to pictures where good representation is wanted. Nevertheless, abrasion methods can be very effective when properly used. Through expert handling of abrasion, unusual results can be obtained; considerable artistic skill

and much patience, however, are required. Abrasion work includes the use of pumice, razorblades, and etching knives.

Pumice, a fine abrasive generally obtainable at drugstores, is sprinkled on areas to be reduced and rubbed on the print by means of cotton or a charcoal stump. A charcoal stump looks about like a blotter pencil and can be obtained at any art store. (This abrasive may also be used to smooth pencil-work on a print.) Much care must be used in handling pumice, lest it wear away the emulsion too rapidly. The used pumice can be returned to its container and saved for reuse. Pumice works best on paper which has no extra gelatin coating, such as Defender Royal.

A razorblade is frequently used in exercising local control, and is especially valuable in removing small blemishes, including tiny black specks that appear in a print because of pinholes in the negative. Choose a new, finest-ground, double-edge blade. Quarter it for easier handling. Hold the piece of blade as nearly vertical to the print as possible, and move it gently back and forth, shaving barely perceptibly. Use the corner of the blade for reducing tiny spots. Much care in use is necessary, otherwise the sharp steel will penetrate the emulsion too quickly. Practice shaving local areas of a discarded print before tackling a good print. Discard razorblades if they show the slightest tendency to shave unevenly or make rough spots.

A knife is used by some workers, but is seldom as sharp as a new razorblade, and must be handled more judiciously. Successful knife-work in print-retouching, as in negative control, depends upon the sharpness of the blade. A good knife-handler must always be a good knife-sharpener. The sharp knife is handled much like a razorblade, the area to be reduced shaved with light strokes all taken in the same direction or cross-hatched. The blade should never be used on the paper with a scrubbing motion, that is, from side to side. Keep a good stone at hand constantly for sharpening the blade.

CONTROL WHEN MAKING THE PRINT

Sulphide toning is frequently used as a means of print intensification, as well as for changing the color characteristics of the print. The sulphide- or sepia-toning method follows:

1. *Bleach*

Pot. Ferricyanide— $1\frac{1}{2}$ oz. 75 grs.

Pot. Bromide— $\frac{1}{4}$ oz. 35 grs.

Sod. Carbonate— $\frac{1}{2}$ oz. 70 grs.

Cold water—32 oz.

Bleach thoroughly fixed and thoroughly washed prints in the bleaching solution until all dark tone has turned light. Wash in running water for 10 minutes. Redevelop until full-strength sepia tone is secured (about 1 minute) in:

2. *Redeveloper*

Sodium Sulphide— $1\frac{1}{2}$ oz.

Cold water—16 oz.

Dilute 1 part redeveloper with 8 parts water.

Wash in running water for 5 minutes. Harden if desired. Wash again for 5 minutes. Dry.

Spotting and Print-Retouching

Spotting is a kind of local intensification nearly always desirable to some degree before any print is sold or shown. It is the easiest of all intensifications to accomplish, but at that it requires considerable practice and discernment before satisfactorily executed. A good spotting job should not be noticeable; a poor one is quite obvious.

The spotting pencil is the easiest medium to use. It is not the most satisfactory, however, for high-class work. The principal objection to the pencil as a spotting medium is that when light strikes the graphite deposit from the pencil, it reflects with an intensity that is

A GUIDE TO PHOTOGRAPHIC CONTROL

different from the reflection from the rest of the print surface, thus calling attention to the spotting. Obvious spotting is a mark of hurried and cheap workmanship, and should be reserved only for spotting quick proofs and types of work where detection is not of importance. The pencil is kept sharp with an emery cloth or emery board. The graphite is stippled on the print.

Spotting colors applied with a brush are not too difficult to use and give more satisfactory results than pencil-work. Colors are generally available in dry form on a set of cards, in moist tube colors, or as liquid-dye colors. No photographer should ever be without at least a set of spotting colors in card form, and a small brush that can be shaped to a fine point.

Card colors usually include black, white, and sepia. To use, apply a small amount of saliva or water to the brush and touch the brush to the card. A small deposit of color will adhere to the brush, and can be wiped or daubed on a corresponding strip to match the tone of the area where it is to be applied. Apply this color to the print with the tip of the brush in a dotting or stippling motion. The initial coat should be lighter than the surrounding tones, so that the color can be built up slowly. Never try to brush on spotting color. If the straight color is too dark or too light to match the area being spotted, use your thumbnail as a tiny palate and mix black and white color there until the proper blend is achieved. Sepia color is used in spotting sepia or other brown-toned prints. Card colors are most efficient when used on matte-surface papers.

In using *tube colors*, squeeze a small portion of the proper pigment into the cup of a china watercolor palette and blend the color on the stoneware. The color must not be applied too heavily at first, but should be built up. The moist tube colors are usually most efficient on glossy prints intended for reproduction.

Dye colors are becoming increasingly popular. They are very effi-

CONTROL WHEN MAKING THE PRINT

cient for both spotting and retouching in dark tones over larger areas. The dyes penetrate the emulsion and become as much a part of the finished picture as the silver image itself. They are usually available in sets of various dilutions, and should be transferred by medicine dropper to a china palette so the density may be readily noted. Further study of the color is made after a brush charged with the color is touched to a clean white blotting paper. Dye color is less easily removed than other spotting material, and must be more carefully applied, with density built up to match the surrounding areas. Moist licorice applied with a pointed brush may be used to spot dark areas on glossy prints.

There are a few additional tips on spotting or retouching worth remembering. It is easier to build up tone in a print and cover poor negative-spotting than it is to remove and retouch blemishes or spots from the print. Never print from a negative that is full of pinholes; first spot the negative as best you can. It is true that if you overdo the negative-spotting, the resulting print will show white or light specks, but these can be spotted out with dye or watercolor, whereas black specks resulting from unspotted negatives must be scraped off with knife or razorblade. As the scraped emulsion or paper absorbs the color more rapidly (and usually more unevenly) than the natural emulsion, poor spotting often follows knife-work.

A small charcoal stump is very convenient for blending retouched work where pencil or graphite sauce is used. Too much graphite applied to an area may be removed with a kneaded rubber eraser. Stove blacking in stick form, such as the Morning Star brand, may be used to blend backgrounds in matte paper. It is also very useful for paper negative work.

If considerable pencil and abrasion work is to be done on a print, make the print on a paper which has no extra gelatin coating. A Wolff pencil is ideal for this kind of work. The powder which accu-

A GUIDE TO PHOTOGRAPHIC CONTROL

mulates when the pencil is sharpened should be saved for use in blending in large areas.

Split-toning

This is a process whereby a duotone effect can be achieved through control of the toning process. You paint areas which you desire to keep in their normal photographic tone with rubber cement, being careful that the surface of these areas is completely covered by a thin film of the waterproofing material. Then proceed to dye the print in the desired toning bath. When the toning is complete, wash and dry the print in the usual manner. When the print is dry, carefully rub the rubber cement from the surface; the duotone print is then ready for mounting. By carefully calculating the successive areas to be toned, and by following this procedure, it is possible to obtain in a finished print as many colors as there are chemical toners.

Air Brush

Air brush is used principally on work that is to be reproduced or copied. The air brush, with a standard air-brush color, is used to build up solid tones in selected areas. Transparent masking tape, rubber cement, or frisket paper is used to protect the remainder of the print. If the areas to be controlled by an air brush are straight-edged, mask them by simply fastening transparent Scotch tape on the edge of a piece of paper slightly larger than the portion of the print to be protected, allowing the tape to extend beyond the edge for about $\frac{1}{4}$ -inch. Tape this gently in place along the edge of the area to be masked. If care is taken, the edge of the tape may be made to follow the outline of the area to be air-brushed. If this is not satisfactory, carefully cut through the tape with a sharp knife, following the outline. When the air-brushing is complete, carefully remove the transparent tape from the print. (When applying Scotch tape, be

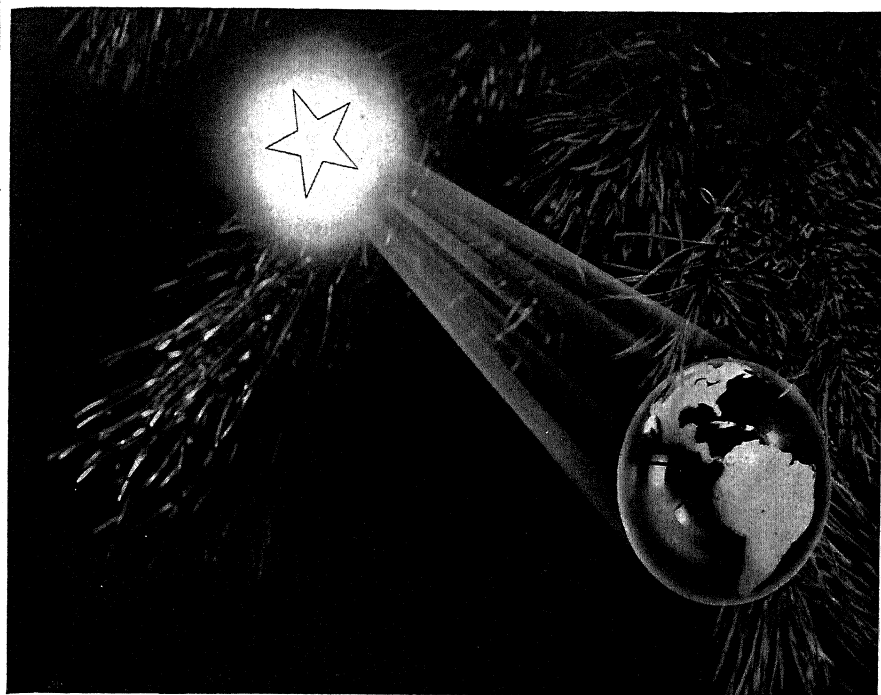


Fig. 63

This illustration, which was used as a magazine cover and a Christmas card, was made by photographing a round tree ornament on which a map had been painted; then the area to provide the starlight was put in with air brush. The light rays from the star were air-brushed on the photograph after the star was painted on.

careful that you do not press it down so tightly against the print that the emulsion is damaged when the tape is removed.)

When air-brushing irregular areas, use frisket paper as a mask. Frisket paper is made by coating thin, transparent paper with at least two thin coats of a good-grade rubber cement. Allow the rubber cement to dry between coats. When both coats are thoroughly dry, apply the frisket, cement side-down, to the surface of the print. Then carefully cut through the frisket along the outline of the area to be

air-brushed, making sure that the blade does not penetrate and mar the print. Peel out the cut area of frisket paper and apply color by air brush. Build up the color slowly and carefully. Air-brushing should not be obvious, and won't be if there is careful matching and blending of tone.

The air brush can be used to emphasize or minimize selected areas, eradicate imperfections of negative or print, create the illusion of a smoother surface; or for greater definition of line or general change of form. Gum arabic added to the moist color to be air-brushed on prints not intended for reproduction, adds luster. When using the air brush, see how little color can be used.

The brush should be held at least 6 inches from the work. Spots of air-brush color on the print can be removed with a camelhair brush or a piece of cardboard sharpened and moistened.



TRICKS OF THE TRADE

Each new generation of photographers "rediscovers" some old photography method, and, like the lad who impaled a plum on his thumb, says, "What a good boy am I." Usually it is only the application that is new. In this category fall many of the so-called "trick" effects—montage, photograms, and paper negatives. They are modern adaptations of techniques as old as photography itself. Thomas Wedgewood and Sir Humphry Davy made leaf prints (photograms) early in the nineteenth century; about 1835, Fox Talbot revolutionized early attempts at photography by making paper negatives; and what was probably the largest montage ever attempted was made by O. G. Rejlander in the middle of the nineteenth century. Only col-

CONTROL WHEN MAKING THE PRINT

lage has any claim to real modernity, and even it is a kind of adaptation of montage.

Combination

The combination of two or more images to form one final print is perhaps the simplest form of combination work. This is achieved by combining the images on one photographic film, by combining the images of two or more negatives on one print through enlarger manipulation, or by pasting the images on one surface and rephotographing the combined composition.

Photograms

This is the simplest of all photographic techniques. One merely places an object on a sheet of photographic paper, then briefly holds a light (it may be a flashlight, a weak incandescent light, or rays from the enlarger) above the object to make the exposure. When the paper is developed, the silhouette of the object will be seen. If the object is opaque or transparent, some qualities in addition to silhouette will be seen. If the object is glass, the light rays will bend as they strike the transparent body and scatter to form interesting patterns on the sensitized paper. If the light used to make the exposure is moved, the resulting photographic image will show the effects of the motion.

Photograms generally result in the maximum contrast in a print. The scale goes from the pure-white of the paper to the jet-black of the developed silver, with few intermediate tones. While interesting in themselves, photograms can be used in conjunction with full-tonal-scale photographs. For example: a spray of fern, grain heads, a lace net, can be laid upon the sensitized paper while a picture is being enlarged, and the developed print will reveal a photogram of the object in combination with the image projected from the enlarger. Figure 3 illustrates this. When transparent objects, such as

A GUIDE TO PHOTOGRAPHIC CONTROL

crystal, are used, fantastic shapes result. Principal controls in making photograms lie in the placement of objects on the paper and proper exposure to give rich blacks.

Montage

There are three main types of montage, and in making them the photographer has several controls available. These types are: the multiple exposure of a single sheet of film in the camera; the combination of two or more images on a single sheet of paper by enlargement; and the cutting, pasting, and rephotographing of selected prints. Each type has its particular uses, as well as advantages and disadvantages. Each requires careful planning, layout, and photographic control.

1. *Multiple Exposure.* The multiple-exposure montage is one where there is usually a dominant element of image, with shadow or ghost images forming the background (Fig. 65). Organize and plan the best interpretation of the idea to be presented by sketching a layout on a sheet of tracing or other transparent paper, or on the ground-glass of the camera. Indicate where each picture element is to appear in the finished print, and carefully check composition before each exposure to see that the image appears in the proper place on the negative. A black background is usually best for multiple-exposure montage, unless some special overlapping of images is desired. Expose the principal or key image as near normal as possible and cut the exposure of the other elements. Short exposures will appear as ghost images. Some cameras are equipped with revolving backs which permit rotating the picture area for each exposure.

2. *Combination Enlargement.* It is often impossible to make the montage directly on the photographic film, because of the unavailability of time, place, or subject. Or it may happen that two or more photographs made at different places subsequently suggest the com-

CONTROL WHEN MAKING THE PRINT



Fig. 64

This montage was made by combining the images from two negatives by two separate exposures on the enlarging paper. The background negative was made by copying a reproduction of a painting. When it was printed in the enlarger, a mask on a wire (Fig. 61) was used to prevent any light striking the paper in the area where the portrait was to be printed. A portion of the portrait negative was treated with coccin dye to make opaque the area around the head. Then the portrait was then printed in the area unexposed in the first printing.

bination. The enlarger can then be used to combine the images on one sheet of paper. This method permits a great amount of control.

The simplest form of such montage is one where masks are used

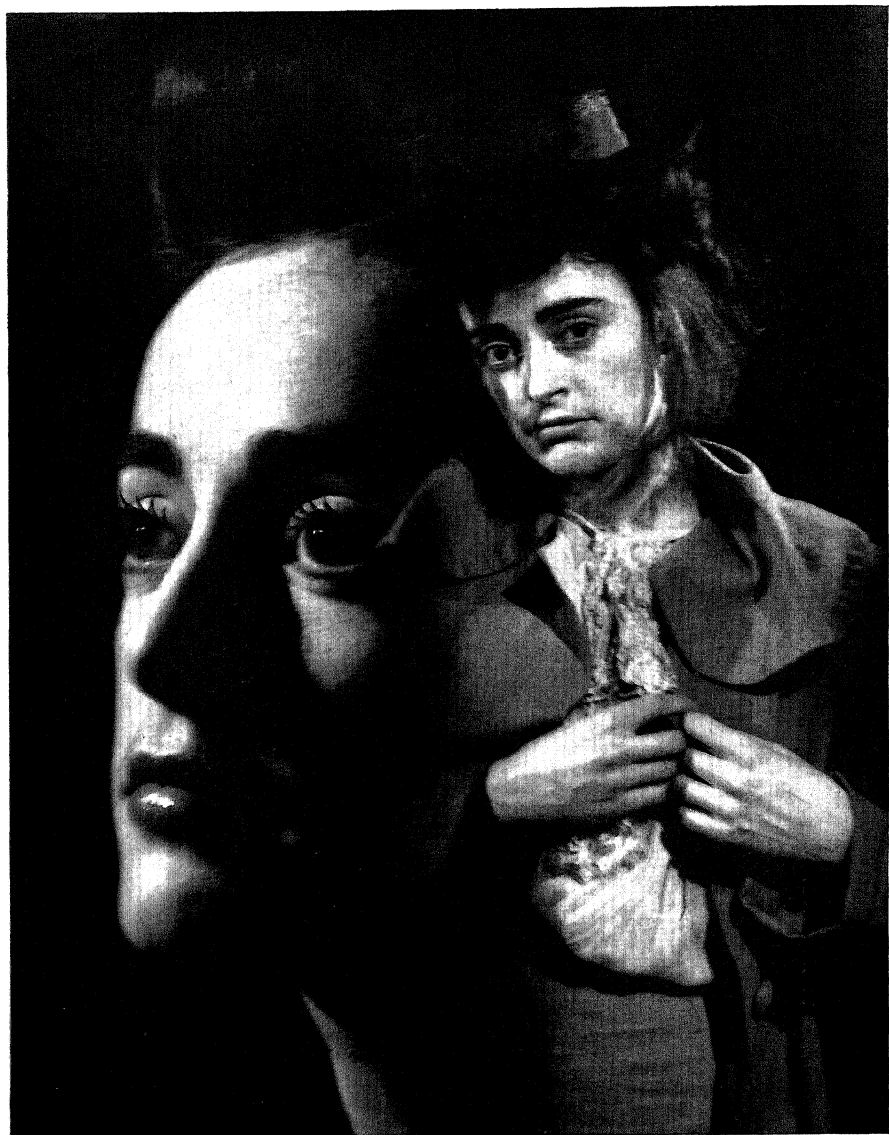


Fig. 65

This montage of Eliza Doolittle of the play, *Pygmalion*, was made by double exposure on the negative by following a rough sketch made on the ground glass with a wax pencil. When making a montage of this kind be careful where the light falls upon the subject and that each exposure is the same so that final development will be even.

CONTROL WHEN MAKING THE PRINT

to print several different images on one sheet of paper. The chief disadvantage of this method is that the mask prevents a blending of the images into one whole composition.

Good masks are available commercially, but are also easily home-made. Use a piece of cardboard (such as comes packed with boxes of enlarging paper). Make an outline layout of the finished montage, and, with a sharp blade, cut on the lines indicated in the layout, being careful that all edges are clean-cut—no protruding rough edges to prevent the segments of the mask from matching tightly. Save the cut-out segments for putting back into the mask during printing. Decide what images are to be used in the layout, and stack the negatives near the enlarger. (As all the enlarging is to be done on one grade of paper, the negatives should be of much the same printing quality.) Place enlarging paper on the easel, and on top of this lay the complete mask with all segments in place. Put the first negative to be printed in the enlarger, and project it on the mask segment for that image. Make a test strip to determine what exposure will give the best print quality when developed for exactly 2 minutes. When this has been determined, lift the mask segment and make the exposure indicated by the test sheet; replace the segment in the mask and proceed to set up the second image. After focusing the second negative on the area where the image is desired, again make a test strip for perfect 2-minute development; remove the second segment from the mask and expose. Proceed in this manner until all areas of the paper have been printed.

If test strips and subsequent exposure on the montage paper have been carefully and accurately executed, the overall effect of the finished montage should be an even gradation of tone quality. It is possible, while the print is being developed, to flash the print along the mask-lines so that an air-brush effect is obtained. A pencil light fitted

A GUIDE TO PHOTOGRAPHIC CONTROL

with a black paper cone to narrow the light beam is useful for such control.

Greater latitude in image combination is possible through multiple printing with the enlarger but without a standardized mask; considerably more care is required, however. Yet the results are worth this extra work, because images can be made to overlap and blend into each other (Fig. 64). Here again, as all the printing is to be done on one grade of paper, all the negatives to be used should match in density, unless special effects such as one or more dominating images are desired.

After selecting the negatives to be used, place a piece of discard double-weight paper the same size as the finished montage in the easel and make a rough layout. Generally it is wiser to avoid using negatives which require highly accurate matching of images, for the blending of one image into another furnishes much of the pleasing quality of this montage technique. (It is usually possible, when only two negatives are being used, merely to refer to the layout and hold back the second area with the hand or a piece of cardboard glued to a wire.)

After the unexposed enlarging paper has been seated on the easel, place the layout on top of it. The image from the first negative is focused on the layout and the easel adjusted so that the image is projected onto the paper area. Use a test strip as above to find printing time for the first negative. Next, while holding back the light from the enlarger so as to protect the paper in areas to be filled with the second negative, make the exposure. Again cover the paper in the easel, change to the second negative, focus on the layout sheet so this image falls in its allotted space, make the test strip, determine exposure, remove cover, and make the exposure. Dodge to protect the first exposure, being careful that the dodging device (whether your

CONTROL WHEN MAKING THE PRINT

hand or a dodging wire) is kept in motion so that a blending of the images results. (Any subsequent negative is projected in the same manner.)

This method is especially efficient for printing-in clouds, tree branches, or foliage, where a framing device is needed. If the non-printing areas of the negatives are heavily treated with new coccin dye, there will be less chance of undesirable portions of a negative appearing in the final print due to faulty dodging. Fig. 66 is an example of the use of this technique in printing-in clouds.

Where close joining of two or more images is required, carefully place a sheet of discarded double-weight paper, back-side toward the enlarging lens, in the easel. Place one of the negatives in the enlarger and compose the picture on the paper. With the light of the enlarger to guide you, trace the outline of the desired image on the white layout paper. Remove the layout sheet and cut out on the outline. This piece serves as a mask to protect more exactly areas not being printed, and, with careful manipulation slightly above the enlarging paper, produces excellent results. This method can be expanded to include images from several different negatives.

3. *Cutting, Pasting, and Rephotographing.* If well-defined edges of the images are desired, the cut-paste-and-rephotograph plan should be used. This method of making a montage is commonly referred to by publishers as the “*cookie-cutter*” technique. Although a preliminary pencil layout is not absolutely necessary, diagraming is helpful in making the final pasteup job, since some control is necessary to guide you in determining sizes of separate images. Make several prints containing the desired picture elements, then carefully cut them out according to patterns fitting the layout or diagram. Use a sharp cutting tool to insure clean edges, and bevel the edges of each print with fine emery cloth or the finer side of an emery board, so that they come in contact with the mount with a minimum of paper-

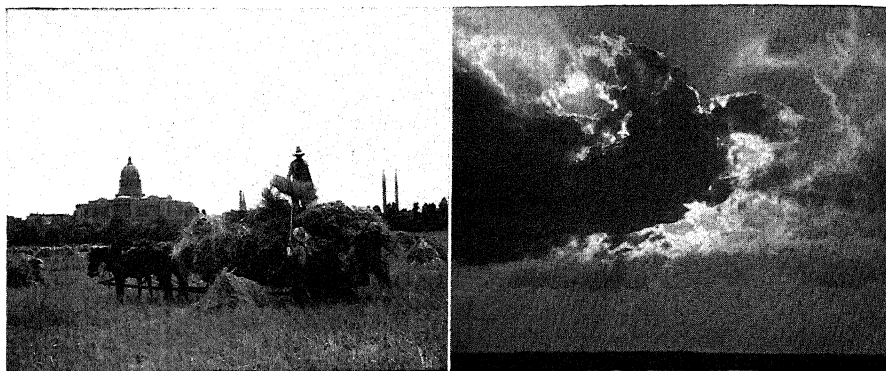


Fig. 66

These two pictures from 35mm negatives provided the basis for the paper print "Wealth of Missouri" shown in Fig. 68.

edge showing. Where dark prints are to be mounted on a dark base, carefully paint the edge of the print with India ink or moist watercolor so that the image will not appear with a white outline. Lay the prints on the cardboard or mounting board and study various arrangements. When satisfied, mount the pictures with a good-grade rubber cement. The montage is now ready for photoengraving or copying, unless air-brushing is indicated (for smoothness and finish). In the latter event, make a good copy negative and an enlargement of the pasteup. The air-brushing is then done on this copy print. (Use at least an 11x14-inch cardboard for the base, so that, when the final pasteup is ready, copying will minimize irregularities.) Any necessary additional retouching can be done on the copy negative.

Collage

An interesting combination of visual forms is the collage—a type of montage. Whereas montage is the use of two or more photographic images, photo-collage is the combination of one or more photographs with other objects to create an impressionistic visual form; a photo-

CONTROL WHEN MAKING THE PRINT

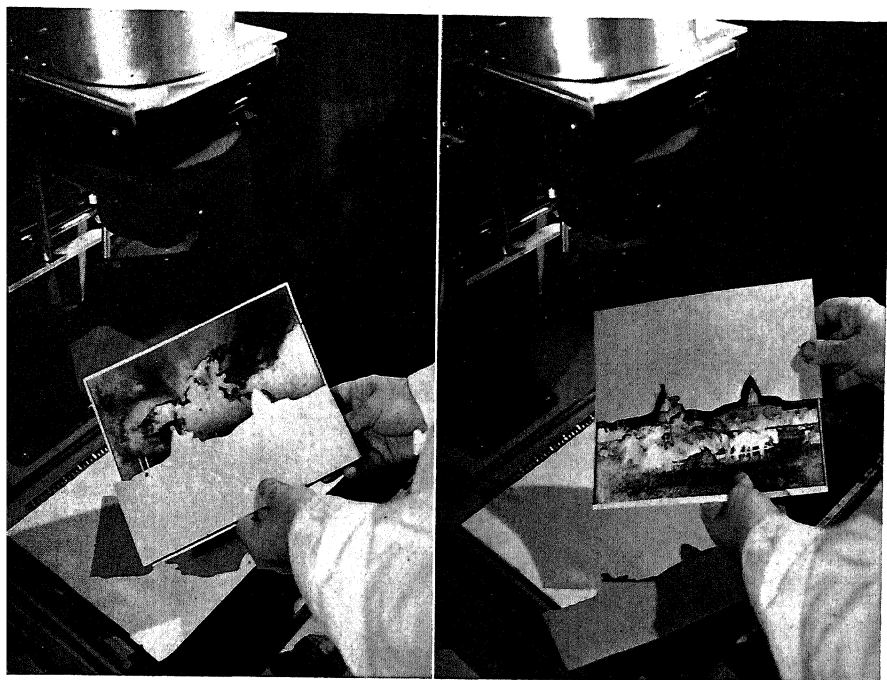


Fig. 67

A cardboard mask cut along the outline of the horizon line of the harvest scene was held over the lower portion of the enlarging paper while the clouds were printed in. The mask was moved slightly during the exposure to allow a blending of the images from the first and second negatives. (Right) The upper portion of the cut mask was held over the cloud portion of the picture while the harvest scene exposure was made. Guide marks on the edge of the enlarging easel indicated the horizon line. Test strips were made on each of the two exposures so that final development time on the combination print would be the same. This resulted in a positive print from which a contact paper negative (lower picture in Fig. 68) was made.

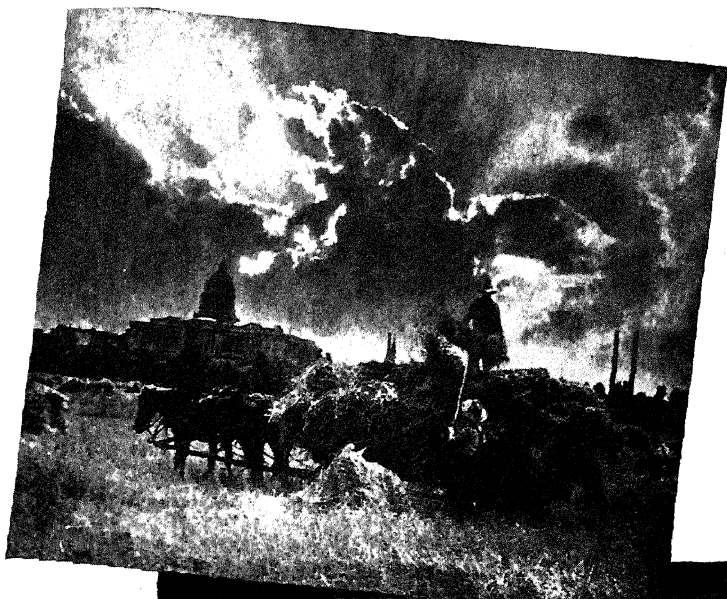


Fig. 68

"WEALTH OF MISSOURI" was made by contact printing from the paper negative (below) which had been made by contact from a positive print produced from two negatives (Fig. 66). A minimum of retouching with pencil was done on the paper negative to increase contrast. The lithographic effect in the final print resulted from the fibres in the paper negative.

CONTROL WHEN MAKING THE PRINT

graph is combined with theater tickets, flowers, or other mementoes, and the composition rephotographed.

This technique can be used to portray an event, or the psychological analysis of a person or thing. Little used thus far, the form bears development especially in the field of abstraction.

Scissors and paste are the main tools needed for composing a collage. Careful analysis and planning are required in choosing the photographs to be used and the items they are to be used with. When the original collage is completed, it is photographed on fine-grain pan film so that the whole is reduced to a flat plane.

Paper Negatives

While the modern American trend is toward the realism afforded by crisp glossy prints, there is a recognized place for pictures of unusual aesthetic qualities; the paper negative is an interesting medium in this field. Prints made from paper negatives are achieved by one of the oldest of known photographic processes. In fact, the paper negative was the great-grandpa of all processes allowing duplicate prints to be made. Before Fox Talbot introduced the paper negative to the photographic world (1841), every photograph had to be made in the camera, and if a customer wanted a dozen portraits he would have to sit for twelve long exposures.

With the paper-negative process there is considerable loss in subject texture, but opportunity is provided for retouching and tone control within the range of skills possessed by amateur photographers whose techniques for the more difficult top-quality control required on film negatives may not yet be developed.

The first step in making a paper negative is to make the very best print possible. This (referred to by paper-negative workers as a *diapositive*) becomes the matrix for a paper negative.

A GUIDE TO PHOTOGRAPHIC CONTROL

The diapositive should be rich in highlights and in shadow detail, and free from stain or abrasion marks. When the print is dry, carefully spot it, strengthening important detail with dye color or moist watercolor. (If black lettering should be desired in the final print, add it with black pencil or ink.) As the diapositive is to be used as a "negative," view it from the back of the print by transmitted light. Objectionable detail or light areas can be eliminated with a retouch pencil, sauce, or retouch dye.

Any of the controls mentioned elsewhere can be used on either the diapositive or the paper negative from it. This includes the use of Farmer's Reducer to control too-dense areas. Very soft lead pencils (6B) are best for most retouching work on paper negatives, although it may be that a 3H or other hard lead is needed to sharpen fine detail. Cake stove polish, crayon sauce, or French chalk also is useful in working large areas on the back of the diapositive or the paper negative. A chamois or blotting-paper stump is used for blending, and an art-gum eraser is used for correction in soft-pencil retouching work.

In most instances extensive retouching will not be necessary, but in cases where considerable soft pencil-work has been done the surface may need protection against smearing with fixative or print lacquer sprayed on with an atomizer.

To minimize paper texture, make the diapositive and its negative on translite paper or the thinnest available matte paper; this, when fully retouched and dried, is rubbed with castor oil.

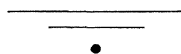
To make a paper negative from the original print, place the spotted and retouched print in a printing frame, back side to the glass. Position a sheet of enlarging paper (single-weight bromide or chlorobromide paper), emulsion side to the print. Make the exposure (through the back of the diapositive) so that at the end of a

CONTROL WHEN MAKING THE PRINT

2-minute development the negative image is complete. It can be seen that the original diapositive and its negative must be the same size as desired in the finished print.

Any further retouching is now done on this negative; and it is then used as a normal contact negative, though increased exposure time is required.

The final print can be made upon a paper of nearly any desired surface. For maximum subject detail, use a smooth paper; when paper texture is desirable, use a rough-surfaced paper. A slow enlarging or a fast contact paper may be used for making the final print. Develop it in the usual manner, wash thoroughly, dry, mount, and spot; and it is ready for exhibit.



SOLARIZATION

Solarization is one of the most interesting of photographic experiments. It involves reversal of the partially developed photographic image by exposure and redevelopment; and the reactions of amazement, excitement, almost disbelief, which are experienced while watching the process, make it worth the trouble to attempt at least once.

Solarization may be deliberate or accidental, and most photographers sooner or later, in a moment of ignorance (sooner) or carelessness (later), produce a solarized negative or print. The accidentally produced example of solarization may prove pleasing, or may be merely a horrible example of fogging; but, accidental or deliberate, it is the result of the same basic process. Only in deliberate solarization is the process under the photographer's control.

Accidental solarization is generally the result of either an extreme

overexposure of film or paper, or of a sensitized material's being exposed to an "unsafe" safelight, or of stray light in the darkroom during negative development.

Deliberate or controlled solarization permits experimentation with a novel photographic technique that results in pleasing photographs of a unique quality. No gadgets, film, paper, developer, or equipment other than those common to all darkrooms are required. Likewise, no elaborate preparations are necessary; it is even possible to make a completely solarized print in one darkroom session.

(Reversal as used in ciné work and some types of color photography operates on a similar principle, except that the emulsion is especially prepared and a special chemical solution is used to dissolve the negative image, so that when the underlying image is exposed and developed a positive image results.)

Keep notes on your work, for not always is the first solarization experiment a successful one, and in any case the notes will be valuable in further experimentation. Especially valuable are data on first development time, flashing time, and redevelopment time.

The three experiments here discussed present basic procedures, from which many variations are possible:

1. Start, as always, with a good negative. A good negative for solarization must be full-bodied, of good density and high contrast, and with sharp strong image, as solarization reduces contrast. Such a negative may be chosen from the files, or especially made. Light the model with two wide-beam spotlights, the "barn doors" set to prevent stray light from hitting the camera lens. Place the two lights at approximately a 45° angle in back of the subject, so that light is strong on figure outlines yet bends slightly around contours. Strong lines are accentuated by posing the model in front of a black drape. Negatives for the illustrated example were made on Ansco Pan Press developed in Ansco 47. The resulting negatives would have required

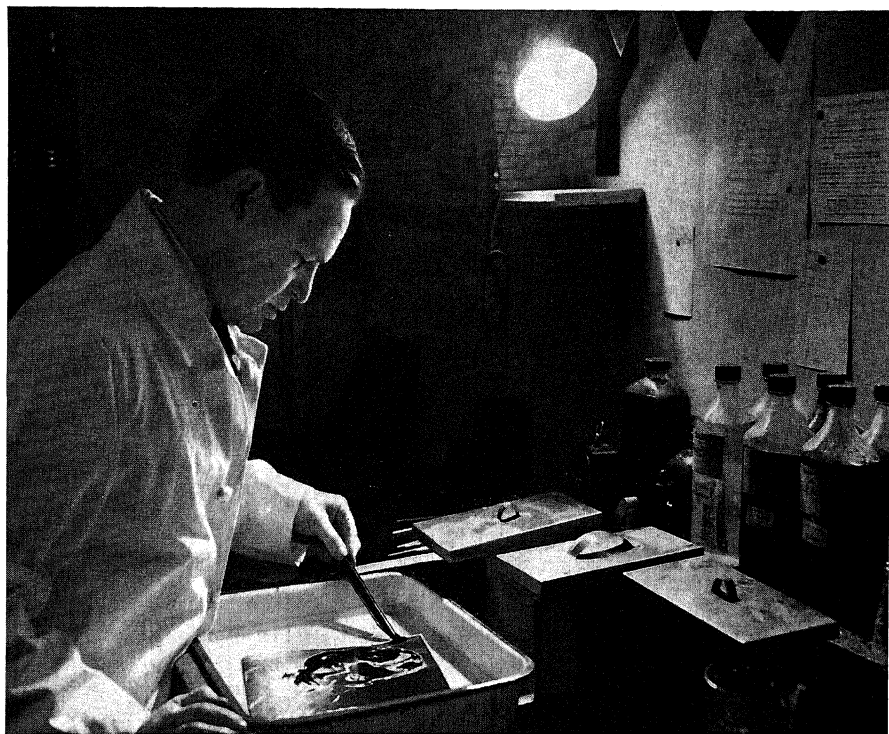


Fig. 69

The principal control in making a solarized print is the flashing done after development is underway. There is a definite ratio between the distance of the weak white light to the print and to the length of exposure. The print being solarized need not be taken from the developing solution during the flashing.

a No. 1 paper for normal projection printing, but a No. 2 paper (Defender Velour Black, glossy 8x10, single-weight) was used. This was developed in D-72.

With the chosen contrasty negative, make a normal exposure (test strip) on paper at least one grade more contrasty than normal for the negative, then proceed to development.

Develop the print in regular developer at normal temperature until near completion (try three-fourths normal time); then flash it

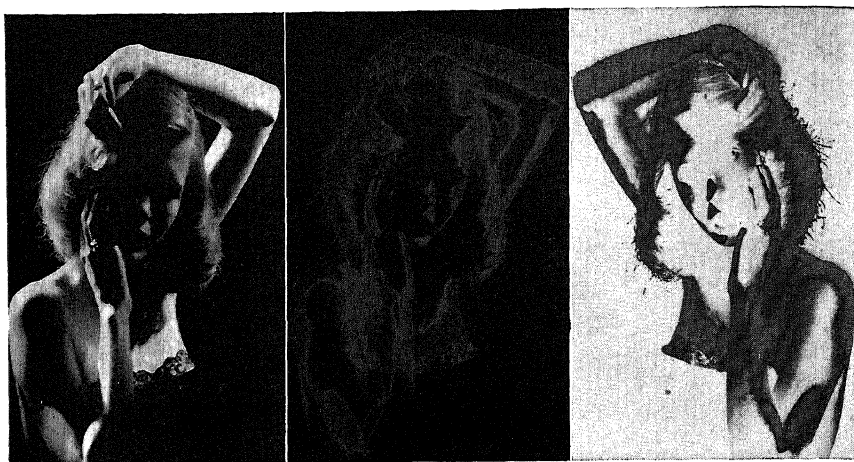


Fig. 70

The picture at left is a straight print from a normal negative. The middle picture was solarized as explained in the text and the picture at right is a print made by contact from the solarized print.

with a white light (15-watt recommended) for approximately 4 seconds at 18 to 24 inches, though the exact time and distance will vary with the grade of paper used. It is best to leave the print in the developer while flashing.

Solarization should begin during the flashing, and development continued only until the desired amount of solarization has taken place. If development is carried too far, only a badly fogged print results. It is impossible to give a set of rules for this unique process, because solarization is an unstable, tricky business, and no matter how closely formulæ and processes are followed, standardized results are not the order of the day—another point to intrigue interest.

When the strange half-negative, half-positive development is completed, place the prints into stop bath, hypo, and wash as for usual prints. Or wash only 15 minutes and begin the second experiment, which involves making a paper negative from the original solarized

CONTROL WHEN MAKING THE PRINT

print. This original print will have an all-over gray tone, and making a paper negative from it eliminates much of the grayness, increasing contrast—though some detail will be lost.

2. The paper negative is made by contact, as explained previously. To make the illustrated example (Fig. 70), an 8x10 printing frame was used with a single-weight (Defender R Velour Black No. 3) paper; exposure was from a single 60-watt lamp, and the paper was developed in D-72.

With this paper negative (on which none of the usual paper-negative control work is necessary), it is possible to make duplicate prints with 8x10 Defender SW R Velour Black No. 3 paper in a printing frame.

3. For the third experiment, which is the solarization of a negative, go back to the originally chosen negative and make from it a top-quality print, which need not be more than slightly contrasty, as contrast increases in the copying process. It is advisable to use only copy negatives for negative solarization, since, due to instability, valuable exposures may be lost.

Start development of the negative, and when a third to a half of development time has expired, experimentation may begin. Expose the negative, out of the developer, to a much weaker light than suggested for print solarization. The flash of a match, a pencil light, or (in the case of pan film exposure) a red safelight, may be very adequate exposure; and exposure time should be short.

Complete the development of the negative, fix, wash, and dry as for a normal negative. If the finished product has a partial-negative, partial-positive appearance, it is then ready to be printed.

Experimentation in solarization need not end here; work can continue in further processes involving reticulation, bas-relief (double-negative) photographs, or extensive negative control such as partial bleach or partial intensification, line-drawing, texture screens, and

A GUIDE TO PHOTOGRAPHIC CONTROL

light-painting. Thus there is an almost endless list of processes available. Most of them are adaptations of experimental processes tried during photography's early days, then discarded in favor of something which represented progress. Modern techniques are therefore recommended to the beginner, because the best of them embody the most practical of what has been tried in the past plus the best of the new. This does not imply that the photographer should be content to restrict his thinking and his techniques to copybook procedure.

CONCLUSION

PHOTOGRAPHY needs more mentally adventuresome workers. The art has made amazing progress in some fields; is still woefully lagging in others—particularly portraiture. There are thousands of persons calling themselves photographers who have never read so much on the subject as the instruction leaflet packed with each roll of film . . . tens of thousands who have never peered inside an art or photography book, attended a lecture or clinic, looked at a photography magazine. This is extremely unfortunate in light of the availability of such information sources.

Photographers also need to be eagerly anticipating the future through active participation in the present. They should not be so cowed by the real and imaginary fears of the present generation that they create nothing beautiful today, lest they and their creation be destroyed tomorrow.

Creative work is the result of fusions of many known methods and ideas. The photographer should accept the challenge to do an explorer's job, and, through careful inquiry, find out what has gone on in the past, noting paths that might have been overlooked and inquiring into them. Information screened from exploration and research can be utilized by the photographer to combine various known elements to create new highways in photography. Through this method of controlling his photographs, the photographer will learn for himself that the possible is not limited to the known.

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INDEX

A

Abrasion work, 164-67
Absorption and reflection of color, 51
Abstraction, 6
Action, speed of, 90-91
Advertising and business, pictures for, 5, 12, 108, 148, 157
Agitation of film in developing, 113, 118-20
Air-brushing, 170-72
Alum, chrome, 120
Angle of camera, 60
 in face portraiture, 78
Angle of motion, 91
Angles of approach, various, 59-64
Antihalation, 121
Appeal to the senses, 11
Appearance and reality, and emotional image, 23-24
Approach, 7-10
 angles of, 59-64
 mechanical, to composition, 24-25
Art, definition of, 12
Attitudes and gestures as symbols, 34-43

B

Back lighting, 68-69
Background and reading, 15
Background, mental, for good photography, 10
Balance, 18
 in plane and in perspective, 23
"Barn doors" (gobos), 71
Bibliography, 192
Big enlargements, 147
"Bird's-eye angle," 63
Bleaching of prints, 164, 167
"Blowups," 147
Books on composition, 22
Border (frame) of a picture, 22-23, 25, 179
Box, "Brownie," technique, 66-67
Box for viewing prints, 157
Brightening a print, 165
Brilliance, negative, 109
 picture, 148

"Brownie," box, technique, 66-67
Business, photographs for, 5, 12, 108, 148, 157

C

Camera and eye, 52
Camera angle, 60
 in face portraiture, 78
Camera position, 59-63
Camera presence, 81-82
Cameron, Mrs., 138
Card colors, 168
Carrier, negative, 137-38
Centering in a composition, to be avoided, 24
Chemical reduction of prints, 164-65
Chemicals, various, color-sensitivity, 53
Chiaroscuro, 66-78
Choice, of film, 58-59
 of lens, 64
 of subject, 11-12, 45
Chrome alum, 120
Classicism, 7, 10
Clinical photography, 66
Closeups, 62
Clouds and sunlight, 53
Cocain dye, 128-29, 133
Collage, 172-73, 180-83
Color, cause of, 50
 composition, 19-20
 control, use of filter, 95-98
 film, 103
 mass, 29
 photographing, 51
 ranges, 50
 scale, testing of reaction of film, 51
 spotting, 168
 symbolic, 43-44
 wavelengths, 50-51
"Color-blind" film, 50
Color-sensitivity of various chemicals, 53
Combination work, 173, 174
Commercial pictures, 5, 12, 108, 148, 157
Communication through the photograph, 5-7

INDEX

Comparison prints, 157
Compensating filters, 98
Composition of a picture, 13, 17-29
Condenser-type enlarger, 135
Conformity to original, 45
Contact printing, wet-negative, 122
Contact prints, 134
Contrast, 85
 filters, 98-101
 in lighting, injurious, 70
 in negatives, 108-09, 150
 in paper, 150-51
 in printing, 156
 in prints, 75
"Cookie-cutter" technique, 179
Cooper Hewitt light, 135
Criteria of quality, 45-47
Cutting, pasting, and rephotographing,
 179

D

Dark-room eyes, 153
Davy, Sir Humphry, 172
Delsarte, 34, 40
Density, negative, 109, 150
Depth, illusion of, 25
Desensitizers, 111-15
Details, emphasis on, 10
Developers, 111-20
 "dry," 114
 for paper, 152-53
 physical, 113
 portrait, 117
 testing, 105
Developing of negative, 106-28
 of print, 154-56
Development of an idea, 12-15
Diapositive, 183-84
Diffusion, image, 111-12, 138-40
Diffusion-type enlarger, 135
Dimensional lighting, 68
Distance between camera and moving
 object, 91
Distortion, 65
 control, 146-47
Dodging devices, 178-79
Dressing up of prints, 162-72
Dry colors, 168-69
"Dry" developers, 114
Drying, of negative, 123-24
 of print, 161-62
Duotone effect, 170
Dyeing, 128-29

E

Education of a photographer, 10
Effects, dramatic, at various hours, 55
Electronic flash, 94
Emotional and intelligent judgment, 12
Emotional image, 24
Emotional response of a picture, 44-45
Emotions and ideas, symbols of, 34-43
Emphasis on details, 10
Emulsion speed of film, 105-06
Emulsions for proper light tone, 49
Enlargement, 133, 134-37
 combination, 174-80
Enlargements, big, 147
Enlargers, lens, 136
 types, 135-37
Enlarging of wet negative, 122
Entertainment value, 6
Escapism, 6
Ether, refraction in, 53-55
Exposure, 142-43
 meters, 102-05
 time of, 54, 90-94
 time of, and sensitivity, 58
Eye, human, 49-50
 and the camera, 52
Eye portraiture, 80
Eyes, dark-room, 153

F

Face portraiture, 78-89
"Fading Away," by H. P. Robinson, 13
Fantasies in lighting, 69
Farmer's Reducer, 126, 127-28, 164, 184
Fashion pictures, 64, 72
Film, choice of, 58-59
 color, 103
 "color-blind," 50
 panchromatic, 50
 sensitivity, 93-94
Filters, 94-98, 101
 compensating, 98
 light, use of, 55, 71
 varieties, 98
 visual, 75-76
Fixing of film, 121-22
 of print, 158
Flash, electronic, 94
Flash powder, 70
Flashing, 142-43
Flat lighting, 66
Flatness, negative, 109
Focal length, 64-65, 91

INDEX

Focussing, 60, 144-45
Fogging, 113, 117, 185
Form, illusion of, 68
 traditional, 21-22
Frame (border) of a picture, 22-23, 25,
 179
Framing device, 25
Free Lance Photography, 14
Freezing of motion, 93
Frisket paper, 170, 171
Full-key portraiture, 77

G

Gestures and attitudes, as symbols, 34-
 43
Gobos ("barn doors"), 71
"Golden Oblong," 24
Goodness of a picture, standard of, 45-
 47
Grade in paper, 149-50

H

Hair, photographing, 74
Halation, 121
Half-tones, 77-78
Handling film, proper, importance of,
 106
Hands, expressiveness of, 40-41
Hardening, 120
High-key portraiture, 74-76
Hogarth line of beauty, 19
Horizontal approach, 63
Hypersensitizers, 105-06
Hypo, baths and proper use, 158-59
 fresh, 158
 life of, 121
 saving, 158

I

Id, 10
Idea, developmmnt of, 12-15
 representation of, 7
Idea into layout, 15-17
Idealism, 7
Ideas and emotions, symbols of, 34-43
Identification pictures, 67
Illusion, of depth, 25
 of form, 68
 of movement, 28
Illustration, advertising, and publica-
 tion, 72
Image. *See* Subject
Imitation of nature, 6-7
Immortal pictures, rarity of, 11

Impression made by the subject, 10
Impressionism, 7-10
Impulse, acting on, 17
Industrial pictures, 5, 12, 108, 148, 157
Inspection, development of, 117
Instruction by photography, 5-6
Intellectual pictures, 11
Intelligent and emotional judgment, 12
Intensification and reduction of film,
 125-28
Intensification of prints, 163
Intensity of light, 70
Interest and unity, 28

J

Judgment, emotional and intelligent,
 12
 of light, 51

K

Key lighting, 72-78
Knife-work in retouching, 130-34, 166

L

"L" form (right angle), 92
Lamps, photoflood and photoflash, 70
Layout, 15-17
Leaf prints, 172
Length, focal, 64-65, 91
Length of exposure, and sensitivity, 58
Lens, choice of, 64
 focal length of, 64-65, 91
 sharp-focus, 138
 taking, and enlarging, 136
Light, and shade, 48-53, 66-78
 intensity, 71
 judgment of, 51
 natural and other, 66
 rays, quality of, 49
 rays, refraction of, 52
 sun, action of, 53, 54-55
 variability of, 55-57
Line, use of, 18-19
Line and mass, analysis of, 29
Line of beauty, Hogarth, 19
Literature and photography, 12-15
Long shots, 61
Low angles, 63
Low-key portraiture, 76

M

Magnesium flash powder and tape, 70
Make-up, use of, in portraiture, 83-89
Masks, use of, 137-38, 175-79

INDEX

Mass, use and modification of, 28-29
 Mass and line, analysis of, 29
 Mass color, 29
 Mechanical approach to composition, 24-25
 Meters, exposure, 56, 94, 102-05
 Misonne, 57, 139
 Modeling, lighting in, 68-69
 Montage, 172, 174-80
 Moonlight, pictures by, 52-53
 Moral pictures, 11
 Mortensen etching screen, 141
 Motion, angle of, 91
 depiction of, 18, 20
 freezing of, 93
 illusion of, 28
 speed of subjects, 90
 "Mug" photography, 67
 Multiple exposure, 174

N

Natural light, and other, 66
 Nature, imitation of, 6-7
 Negative and positive space, 70
 Negative processing, importance of, 106
 Negative quality, 106-11
 Neutralizing of developer, 120
 News pictures, 48, 125
 Nose portraiture, 79-80

O

"Oblong, Golden," 24
 Organization in photography, 14

P

Panchromatic film, use at various hours, 55
 Paper, 147-50
 for enlarging, 137
 Paper negatives, 172, 183-85
 Pencil, spotting, 167
 Perception of space, 47, 70
 Perfectionism, 7
 Personality, picture, 81-82
 Perspective, balance in, 23
 use of, 24-25
 Photofloods and photoflashes, 70, 71
 "Photogenic" persons, 81-82
 Photograms, 172
 Physical developers, 113
 Pinakryptol, green and yellow, 112
 Placement of subject in composition, 24-25

Plane, balance in, 23
 Planning a layout, 15-17
 Plastic quality, 45, 66
 Portrait developer, 117
 Portraiture, 67, 70, 72-78, 109, 111
 eye, 80
 face, 78-80
 nose, 79-80
 posing a subject, 82, 83
 Position, camera, 59-63
 Positive and negative space, 70
 Powder, flash, 70
 Powell, Jack, screen, 141
 Presence, camera, 81-82
 Print-making, 134-90
 Printing, wet negative, contact, 122
 Printing-in, 113-44
 Processing of negative, importance of, 106
 Projection prints, 134
 Publication illustration, 72
 Pumice, use of, 166
 Purist, photographer, 10
 Purpose, singleness of, 18
 Pyro developers, 116-17

Q

Quality, in pictures, standards of, 45-47
 of light rays, 49
 of negative, 106-11
 of print, judging, 156-57
 tactile and plastic, 45, 66
 technical, versus choice of subject, 11

R

Ranges in color, 50
 Rays, light, quality of, 49
 refraction of, 52
 Razor blades, use in abrasion work, 166
 Reaction of film to color, testing, 51
 Reading and background, 15
 Realism, 7
 Reality and appearance, and emotional image, 23-44
 "Reciprocity," 18
 Record photography, 66
 Red developer, print, 167
 Reduction and intensification of film, 125-28
 Reduction of print, 164-67
 Reflection and absorption of color, 51
 Refraction of light rays, 52, 53-55
 Rejlander, O. G., 172

INDEX

Relationship of length of exposure to sensitivity, 58
 Response, emotional, to a picture, 44-45
 Responsiveness to stimuli, 12
 Retouching, 130-34
 Retouching of print, and spotting, 163, 167-70
 Right angle ("L") form, 92
 Rigidity, enlarger, 136
 Robinson, H. P., "Fading Away," 13
 Rules for composition, 25-28

S

"S curve," 19
 in portraiture, 73
 Scale, color, testing of reaction of film, 51
 negative, 108
 Screens, texture, 140-41
 Senses, appeal to, 11
 Sensitivity, 12
 and length of exposure, 58
 color, of various chemicals, 53
 desensitizers, 111-15
 emulsion, to light rays, 54-55
 film, 93-94
 hypersensitizers, 105-06
 Sepia, toning, 167, 168
 Shade and light, 48-53, 66-78
 Shadows in facial portraiture, 76
 Sharp-focus lens, 138
 Sharpness, negative, 111
 Short-stopping, 154, 157-58
 Shutter speed, 91, 93, 103
 Singleness of purpose, 18
 Skin texture in portraiture, 76
 Softness, negative, 110
 Solarization, 185-90
 Space, positive and negative, 70
 Space perception, 47, 70
 Spectrum, 50-51, 54-55
 Speed, emulsion, of film, 105-06
 paper, 149
 shutter, 90, 91, 93
 subject, 90
 Split-toning, 170
 Spotlights, 71
 Spotting, color, 168
 Spotting and print-retouching, 163, 167-70
 Standards of quality in pictures, 3, 45-47
 Stimuli, responsiveness to, 12

Stop baths for prints, 157-58
 Stoppage of motion, 93
 Stopping, short, 154
 Stopping-down, 144
 Story-telling in pictures, 13-14
 Straight-on approach, 63
 Strips, test, 151
 Subject, choice of, 11-12
 emotional, 24
 moving, speed of, 90-91
 unworthy, 10
 Sulphide toning, 167
 Sunlight, 53, 54-55
 direct, effect of, 53
 Surface, paper, 147
 Surrealism, 7, 10
 Symbols, visual, 30-44

T

Tactile quality, 45, 66
 Taking a picture, 48-53
 Talbot, Fox, 172, 183
 Tape, magnesium, 70
 Tau, Andrew, 116
 Teaching by photography, 5-6
 Technical quality versus choice of subject, 11
 Telephoto lens, 64
 Temperature of development, 117
 Test strips, 151
 Testing of developer, 105
 Testing of reaction of film to color, 51
 Texture screens, 140-41
 Three-dimensional effect, 71, 76, 80
 Timer, printing, 151
 Timing, in making print, 150-53
 of exposure, 54, 90-94
 Tone quality, 45
 Toning, split, 170
 sulphide (sepia), 167
 Tradition in form, 21-22
 Travel pictures, 6
 Tricks of the trade, 172-85
 Truth in photography, 7
 Tube colors, 168
 "Typed" light-work, 72

U

Ultra-closeups, 62
 Unity and interest, 28
 Unity of variety, 17-29
 Unworthiness of some subjects, 10

INDEX

V

Variety, unity in, 17-29
Viewing box, 157
Vision, dark-room, 153
Visual filter, 75-76
Visual symbols, 30-44

W

Washing, of negative, 122
 of print, 159-60
Water, use in washing prints, 159-60
Weston, Edward, 148
Wet-negative printing, 122
Wide-angle pictures, 60-61

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